a journal for precision engineers and all users of industrial diamonds and other hard materials

INDUSTRIAL DIAMOND REVIEW

incorporating INDUSTRIAL DIAMOND ABSTRACTS

MONTHLY 1/3 SUBSCRIPTION 15/- A YEAR

April, 1961 Vol. 21 No. 245

D.S.I.R.
National Lending Library for Science and Technology

4450

NATIONAL ENGINEERING LABORATORY
1 MAY 1961
LIBRARY.

AUSTRALIA
BENELUX
BRAZIL
BRITISH GUIANA
CANADA
FRANCE
GREAT BRITAIN
INDIA
ITALY
JAPAN
NEW ZEALAND
SCANDINAVIA
SPAIN
SWITZERLAND

Triefus

INDUSTRIAL DIAMONDS

TRIEFUS & CO. LTD.,
THAVIES INN HOUSE, 4, HOLBORN CIRCUS,
LONDON, E.C.1, ENGLAND
Telephone : FLEet Street 9741 Cables : Triefus, London

DIAMOND PRODUCTS

TRIEFUS INDUSTRIES LTD.,
MANOR ROYAL, CRAWLEY, SUSSEX, ENGLAND
Telephone : Crawley 2244 Cables : Triefus, Crawley

DRILL BITS DIAMOND TOOLS
DIAMOND MICRO-POWDERS

INDUSTRIAL DIAMOND COMPANY (SALES) LTD.

INDUSTRIAL DIAMONDS FOR ALL APPLICATIONS

DIAMOND POWDER

- We offer a 24 hour delivery service
- Our prices are highly competitive and credit facilities are available

ENQUIRIES INVITED

88/90 · HATTON GARDEN · LONDON · E · C · 1

Telephone: HOLBORN 2642/2247 *Telegrams:* IDECE, LONDON

The new JKS factory at Mochdre, Colwyn Bay, Denbighshire

JKS DIAMOND TOOLS

Write to SMIT'S upon any problem of diamond tools or their application

for every phase of the Engineering and Mining Industries

J.K.S. will manufacture the diamond tools for every industrial application of diamonds in any industry.

J. K. SMIT & SONS DIAMOND TOOLS LTD.

Telephone: *HOLborn 6451

Head Office: 22/24 Ely Place, Holborn Circus, London, E.C.1

2, St. John Street, Deansgate, MANCHESTER. *Telephone:* Blackfriars 0443

14, Queens Road, COVENTRY. *Telephone:* Coventry 25215

Works: Mochdre, COLWYN BAY, Denbighshire

Telephone: Colwyn Bay 44212-3-4

International Organisation Murray Hill, New Jersey, U.S.A., CANADA

with Offices and Works: HOLLAND, FRANCE, AUSTRALIA

DIAMANT BOART

DIAMOND IMPREGNATED TOOLS
ARE USED ALL OVER THE WORLD

Wheels

Saws

Drill Bits

Truing and dressing tools ∴ Hones Boring Crowns
Dental Tools

74, avenue du Pont de Luttre, Brussels, Belgium

Sole representative in U.K.: **F. Yorke & Partners Ltd, Lassell Street, Greenwich London, S.E.10**

DIAMOND TECHNOLOGY

by Paul Grodzinski

800 pages: 500 illustrations: 94 tables.

CHAPTERS

Chapter 1—Technology of Machining Methods.
Chapter 2—Dividing Diamonds and Gem Stones.
Chapter 3—Bruting.
Chapter 4—General Survey of Grinding and Polishing.
Chapter 5—Grinding and Polishing Gem Stones.
Chapter 6—Grinding and Polishing Diamond.
Chapter 7—Drilling and Boring Holes.
Chapter 8—Carving and Engraving.
Chapter 9—Diamond Powder—Its Production and Use.
Chapter 10—Polishing Gem Stones for Jewellery.
Chapter 11—Manufacture of Watch and Instrument Jewels.
Chapter 12—Manufacture of Diamond and Sintered Carbide Dies.
Chapter 13—Industrial Diamonds, Selection and Orientation.
Chapter 14—Setting Diamonds in Tools.
Chapter 15—Grinding and Lapping Sintered Carbides.
Chapter 16—Production of Piezo-Electric and Optical Crystals. Bibliography. Appendix.

From your Booksellers or the Publishers. Price 52/6d, by post 55/-

N.A.G. PRESS, LTD., 226, LATYMER COURT, LONDON W.6.

$10 in U.S.A. and CANADA, distributed in U.S.A. and CANADA
by Huebner Publications Inc., 1975, Lee Road, Cleveland, Ohio.

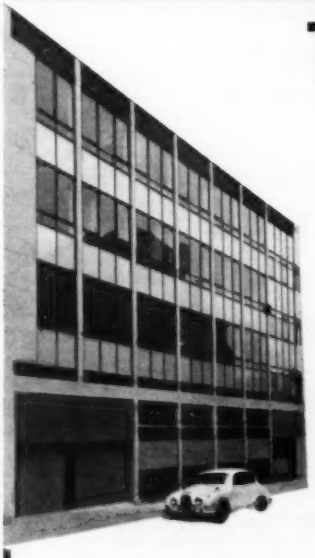
Exporters

WOLVERHAMPTON
DIAMOND DIE
& TOOL CO. LTD.

ALL GRADES OF
BOARTS AND INDUSTRIAL DIAMONDS

11 HATTON GARDEN LONDON E.C.1

TELEPHONE HOLBORN 3017 CABLE PARDIMON LONDON



The Diamond Tool people

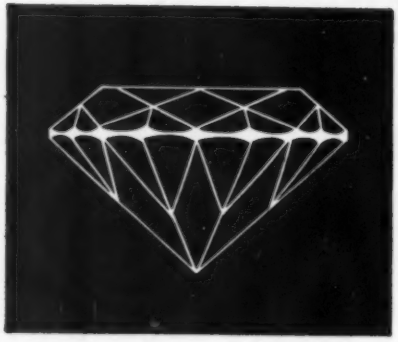
have now moved to our own office block, in the heart of London's diamond industry. This means a better than ever service for you and all your diamond tool and wheel requirements.
Industrial diamonds may look alike, but there is a vast difference between the good and mediocre which only a diamond expert can see. You have to trust your diamond tool supplier because it is on his integrity and experience that your diamond tools depend.
Indusmond is one of a group of companies who have worked in diamonds for as many as ninety years, and have been making diamond tools for twenty years. During this period Indusmond have established a reputation for high quality and perfection that is second to none.
Try Indusmond tools next time—you can trust them!

Wheel Dressing Diamond Tools. Shaped and Polished Diamond Tools. Hardness Diamond Tools. Diamond Impregnated Wheels and Laps. Diamond Impregnated Drills and Saws.
Call and see us at Memfagimal House, 26-29 St. Cross Street, Hatton Garden, London, E.C.1.—you'll be made very welcome.

indusmond
DIAMOND TOOLS

Telephone: CHAncery 7608

Selected rough diamonds and specially graded diamond powders

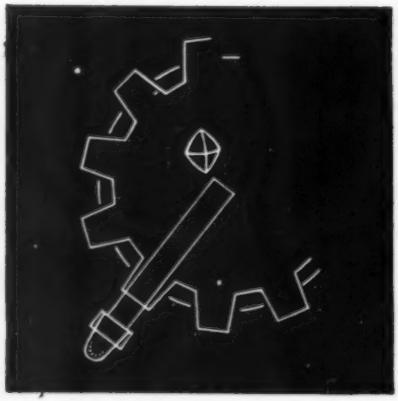


d. drukker & zn. n.v.

specialists in sorting & cleaving

Our new method of diamond sorting will give you new possibilities to get the right materials for the right job.

diamond in art and industry



We present you our private exhibition covering the industrial and the artistic use of diamonds.

If you are interested in our products please visit our works.

amsterdam - holland

12 sarphatikade

phone: 67321

gems - industrials - powder - tools

ask for our new export plan

INDUSTRIAL DIAMOND REVIEW

Vol 21 No 245
April 1961

Editor-in-Chief :
Eric M. Bruton

Managing Editor :
Patrick Greene

★

© 1961 *N.A.G. Press Ltd.—All rights reserved.*

PRINCIPAL CONTENTS

Generally Speaking — **Adamant** — **65**
Application of Industrial Diamonds III — **H. J. Otterloo** — **66**
Engineering, Marine, Welding and Nuclear Energy Exhibition — **73**
Rubber-Bonded Wheels — **75**
Industrial Diamond Association Annual Convention — **77**

★

Industrial Diamond Review is published monthly at 1s 3d per copy, and is obtainable through newsagents and booksellers or by postal subscription (15s yearly, post free). Subscriptions in the United States of America are $2.50, and can be entered through the usual subscription agencies or direct through the publishers :—

N.A.G. Press Ltd
226 Latymer Court
London W.6.
(Telephone : RIVerside 2143).

★

Contributions of scientific, technical and practical interest, and news items, are invited, but responsibility cannot be accepted for the safety of MSS, drawings, photographs or other matter submitted. Material not accepted will be returned.

★

All editorial communications should be made to the Managing Editor at
2 Charterhouse Street
London E.C.1
(Telephone : FLEet Street 1577)

Printed by
Martin's Printing Works Ltd., Berwick-upon-Tweed, England

Generally Speaking

Hitting a new high

The figures released recently by the Central Selling Organization for diamond sales in the first quarter of 1961 show a new record for any quarter of the year has been achieved. The figure, in fact, is over £24,000,000, an increase of approximately four million over the corresponding period in 1960. Figures have been put out this time in a different form from that previously used, and this alteration reflects a change in the internal set-up of the Organization. The high grade (' near-gem ') industrial material, which has hitherto been sold through the medium of Industrial Distributors (Sales) Limited, from the beginning of this year has been included in the Diamond Trading Company's sights. It is therefore only possible to make a comparison between total sales, as a sub-division would be extremely misleading.

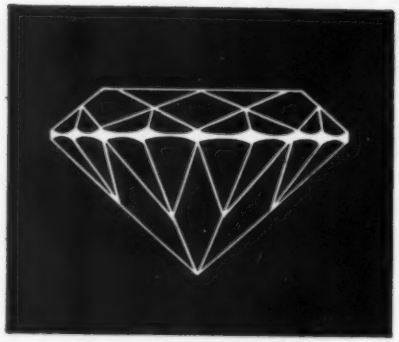
This new system agrees better with the actual state of affairs, since the dividing line between industrial material of high quality and the lower grade gem material is ill-defined, and it is more suitable that it should be dealt with at the same time and in the same manner as the gems.

Hitting a new low

The first experimental drillings for the American Mohole Project* have already been made and early reports suggest that a considerable degree of success has already been achieved. The drilling crowns which carried out these experimental operations were made in the United States from diamonds provided as a gift by Industrial Distributors (1946) Limited, the industrial diamond division of the De Beers company. It is believed that this is the only non-American commercial organization which has supported this very interesting piece of scientific research and it seems certain that their generosity in this matter will be amply repaid by the information on the behaviour of diamond drills in very deep holes, which will be provided as a result of this work. ADAMANT.

* Drilling into the earth's mantle by T. F. Gaskell, M.A., Ph.D., *Industrial Diamond Review* 1959 Vol 19 pp 46-50 (Mar).

Selected rough diamonds and specially graded diamond powders

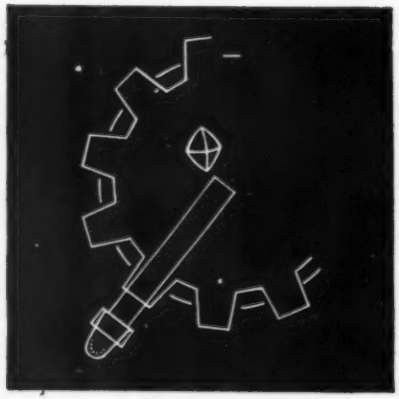


d. drukker & zn. n.v.

specialists in sorting & cleaving

Our new method of diamond sorting will give you new possibilities to get the right materials for the right job.

diamond in art and industry



We present you our private exhibition covering the industrial and the artistic use of diamonds.

If you are interested in our products please visit our works.

amsterdam - holland

12 sarphatikade

phone: 67321

gems - industrials - powder - tools
ask for our new export plan

INDUSTRIAL DIAMOND REVIEW

Vol 21 No 245
April 1961

Editor-in-Chief :
Eric M. Bruton

Managing Editor :
Patrick Greene

★

© 1961 *N.A.G. Press Ltd.—All rights reserved.*

PRINCIPAL CONTENTS

Generally Speaking — Adamant 65
Application of Industrial Diamonds III — H. J. Otterloo 66
Engineering, Marine, Welding and Nuclear Energy Exhibition 73
Rubber-Bonded Wheels 75
Industrial Diamond Association Annual Convention 77

★

Industrial Diamond Review is published monthly at 1s 3d per copy, and is obtainable through newsagents and booksellers or by postal subscription (15s yearly, post free). Subscriptions in the United States of America are $2.50, and can be entered through the usual subscription agencies or direct through the publishers :—

N.A.G. Press Ltd
226 Latymer Court
London W.6.
(Telephone : RIVerside 2143).

★

Contributions of scientific, technical and practical interest, and news items, are invited, but responsibility cannot be accepted for the safety of MSS, drawings, photographs or other matter submitted. Material not accepted will be returned.

★

All editorial communications should be made to the Managing Editor at

2 Charterhouse Street
London E.C.1
(Telephone : FLEet Street 1577)

Printed by
Martin's Printing Works Ltd., Berwick-upon-Tweed, England

Generally Speaking

Hitting a new high

The figures released recently by the Central Selling Organization for diamond sales in the first quarter of 1961 show a new record for any quarter of the year has been achieved. The figure, in fact, is over £24,000,000, an increase of approximately four million over the corresponding period in 1960. Figures have been put out this time in a different form from that previously used, and this alteration reflects a change in the internal set-up of the Organization. The high grade (' near-gem ') industrial material, which has hitherto been sold through the medium of Industrial Distributors (Sales) Limited, from the beginning of this year has been included in the Diamond Trading Company's sights. It is therefore only possible to make a comparison between total sales, as a sub-division would be extremely misleading.

This new system agrees better with the actual state of affairs, since the dividing line between industrial material of high quality and the lower grade gem material is ill-defined, and it is more suitable that it should be dealt with at the same time and in the same manner as the gems.

Hitting a new low

The first experimental drillings for the American Mohole Project* have already been made and early reports suggest that a considerable degree of success has already been achieved. The drilling crowns which carried out these experimental operations were made in the United States from diamonds provided as a gift by Industrial Distributors (1946) Limited, the industrial diamond division of the De Beers company. It is believed that this is the only non-American commercial organization which has supported this very interesting piece of scientific research and it seems certain that their generosity in this matter will be amply repaid by the information on the behaviour of diamond drills in very deep holes, which will be provided as a result of this work. ADAMANT.

* Drilling into the earth's mantle by T. F. Gaskell, M.A., Ph.D., *Industrial Diamond Review* 1959 Vol 19 pp 46-50 (Mar).

Application of Industrial Diamonds III

By H. J Otterloo

In our preceding article we gave a general description of the design of diamond grinding wheels, and we showed how the bonding material, (resin, metal), grit size, concentration, thickness of the abrasive material, and the shape of the wheel are important factors in the correct selection of diamond grinding wheel. We also discussed the fact that the grinding method, the machine, etc., are factors which may have a considerable effect on the results, quite apart from the workman's skill, since we can assume that the grinder is properly trained and instructed. Unfortunately, this is not always so in practice, and in many cases the manufacturer is unjustly reproached for the supposedly unsatisfactory quality of the grinding wheels. But when we have now taken all the factors into consideration, and want to select the appropriate grinding wheel, we must also take into account the latest developments in the field of diamonds. Making synthetic diamonds has always been the great wish of the alchemists, and we shall not discuss here the history of this problem, and only mention the results. It is important for us to know that the General Electric Company have succeeded since 1958 in making artificial diamonds, using a method which can be justified from the point of view of economics, the price being at present equal to that of natural diamonds. The size of the diamonds which can be made is still of the order of 0.1* carat, but this is not a matter of great importance for the use of diamonds in diamond grinding wheels, since for this purpose smaller particles are required. It is obvious that this development of the General Electric Company must be regarded as a matter of great importance for industry. It is also understandable that the people concerned with mining of natural diamonds have reacted to this, and both sides have published detailed reports about the advantages and disadvantages of the two kinds. For the user it is now also much more difficult to make the best selection, in particular because he may also be presented with a combination of natural and synthetic (" Man-made ") diamonds. Since we have collected for some years now much experience in this field, it may be interesting to compare our experiences with other observations. We shall do this later in some detail, and show some graphs which summarize these results. We shall first give a brief review of the various properties of natural and " Man-made " diamonds.

Comparison between natural and " Man-made " diamonds

The earlier types of diamond grinding wheels were made with selected block-shape diamonds, as shown in Fig. 1. This fairly regular shape has obviously the disadvantage that the grains are not held firmly in the bonding material. Also, the grinding process is not very effective, since it depends on the way in which the particles are embedded in the bonding material. This has been discovered after the " Man-made " diamonds came upon the scene. One of the advantages of the " Man-made " diamonds is that, owing to their irregular shape, they can be held much more firmly in the bonding material, while the very sharp points contribute to a better grinding effect. This new grit shape is shown in Fig. 2, where a is a typical contour. The darker spots indicate a certain porosity, which also promotes the retention of the diamond in the bonding material. To what extent the hardness and structure of the " Man-made " diamond compares with that of the natural diamond is a matter we shall not discuss here, because this

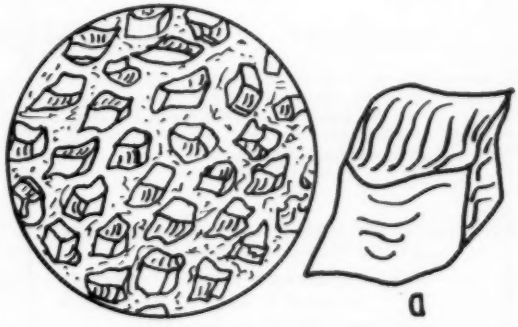


FIG. 1

* From a practical point of view, only smaller sizes are available.

appears immediately in the course of practical work, as we shall show. Purely theoretically speaking, the " Man-made " grain will therefore be retained longer during the grinding process, up to the last moment, and this statement has been confirmed by taking samples from the dust remaining after grinding. As a result of a long series of experiments, † it has now also become possible to present natural diamonds in a different grit shape, as shown in Fig. 3, where ' a ' indicates the shape of the grit as now recommended.

This grit shape has also better cutting properties than the earlier block-shaped grit, and is retained longer in the bonding material, and will therefore produce better results when it is embedded properly in the bonding material. We

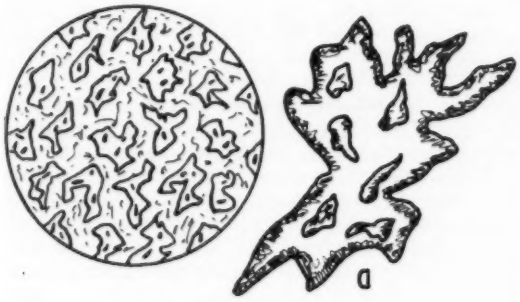


FIG. 2

have indicated in Fig. 4 that if natural diamond of the new grit shape is not properly embedded in the bonding material, the better grinding effect and the longer retention will not be achieved. Graph ' a ' shows how the particles are embedded in a horizontal position in the bonding material, which is naturally a very disadvantageous feature. If we consider all these factors, which have such a great influence on the performance and service life of the grinding wheels, it is obvious that we must be able to check these factors in practice, and we shall later discuss how this can be done.

Graphical representation of the grindability and efficiency ratio

Prof. Dr. Ing. Pahlitzsch carried out already in the earlier stages of the development of " Man-made " diamonds detailed tests in this connection, and presented the results in the form of graphs. This testing is not only a costly matter, and takes up much time, but must also be carried

† At The Diamond Research Laboratory, Johannesburg. See I.D.R. Vol. 19 (1959) pp. 126 and 127, and 146-151.

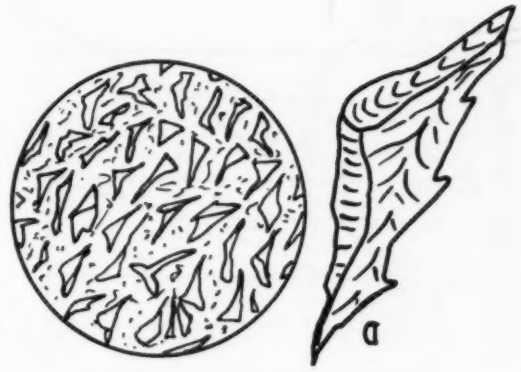


FIG. 3

out by men who are experts in this field. This applies naturally to all tests, but especially to diamond grinding wheels, because we are dealing here with so many different factors which may have some effect on the final results. It is therefore regrettable that Prof. Pahlitzsch's results, as published, do not deal at the same time with the new diamond grit shown in Fig. 3. We must agree that Prof. Pahlitzsch took every care in the execution of the tests, to ensure that a constant pressure was exerted during grinding, and that all other factors were kept as constant as possible. It is interesting that the test results appeared to agree with the results of production work. Without discussing the tests in more detail, we shall now briefly explain the graphs. In Fig. 5 we have plotted the grinding time, in minutes, along the horizontal axis, and the removal of hard metal along the vertical axis. We can read directly from the graph the quantity of carbide ground away during a given period of time. The dotted line a is applicable to a bronze-bonded diamond grinding wheel, line 'b' to a resin-bonded wheel. Prof. Pahlitzsch compared for these tests a resin-bonded grinding wheel and a bronze-bonded one. We can see here therefore (and this is also confirmed by practical

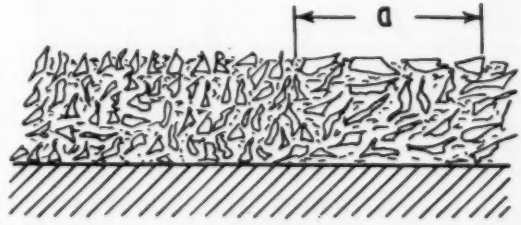


FIG. 4

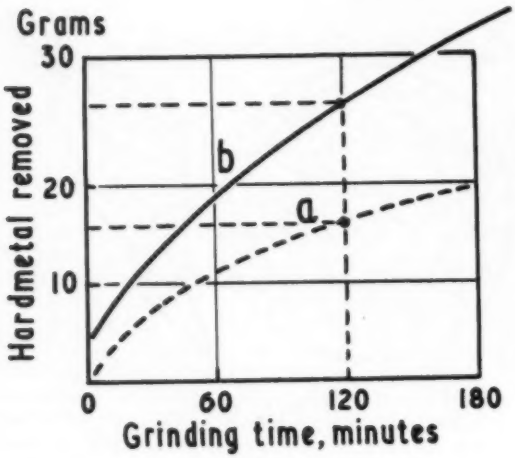


FIG.5

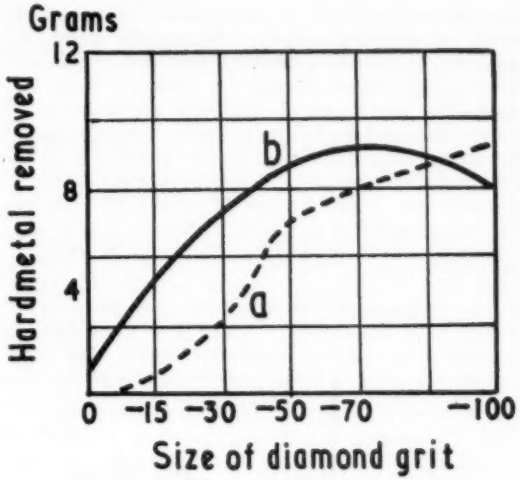


FIG.7

work), as already discussed, that the resin-bonded wheel grinds much better and much faster. After 120 minutes, the bronze-bonded wheel had removed about 18 grams, while the resin-bonded wheel (the resin is a synthetic plastic) had removed about 27 grams during 120 minutes. Fig. 6 shows again the bronze-bonded wheel ' a,' and the synthetic resin-bonded wheel ' b '; the vertical axis shows the wheel wear in this the wheel in case ' a ' amounts to about 12 microns in 120 minutes; and in case ' b ' to about 24 microns. In Figs. 7 and 8 the grindability and the efficiency ratio are indicated in the graphs for grinding wheels of the same type, but different grit sizes. These graphs show also clearly that grit size D70 (200-230 mesh) produces the best grinding results. As we have already stated, this is also confirmed in practical work, and we can mention here also the further argument that the grinding surface with this grit size can be regarded in general as satisfactory, for all kinds of grinding work, and in normal work it can be used for rough grinding as well as finish grinding. This is therefore not only justifiable from an industrial point of view, but has also most advantages from the economic point of view.

We have discussed so far only a small part of

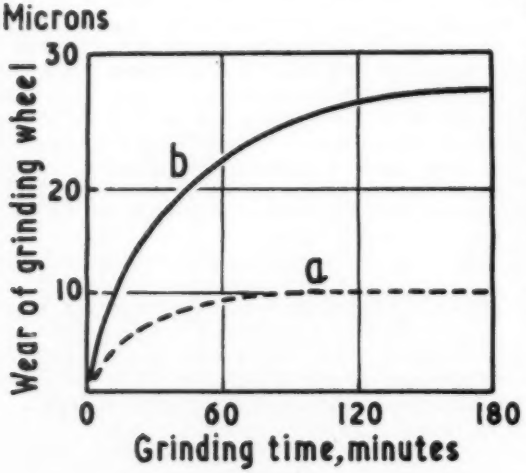


FIG.6

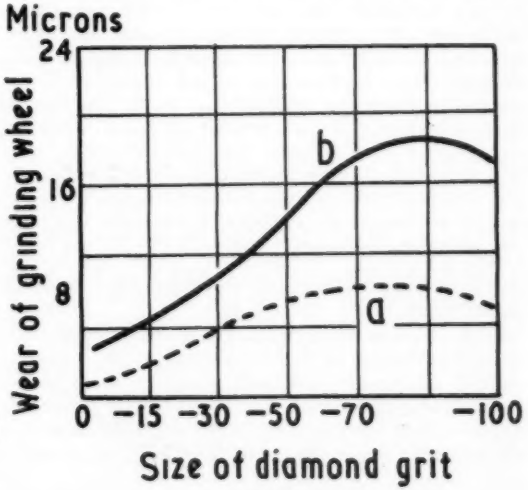


FIG.8

the elaborate tests carried out by Prof. Pahlitzsch, and we could extend our discussion much further, but we shall have to confine ourselves to this summary.

We shall now discuss our own observations, with the aid of a graph which indicates how we can achieve in practical work, on the basis of our own observations and measurements, a certain check over the quality of diamond grinding wheels.

Practical observations

Although the carrying out of tests is in general a costly and time-consuming procedure, and these tests imply that the process is being carried out very carefully, we shall show now that the results can be checked in practice without great costs. When we use diamond grinding wheels under practical conditions for the grinding of hardmetal, which is now done in practically every workshop, it is also necessary, to a certain extent, to ascertain the results achieved with our expensive grinding wheels. We have already discussed many factors which may simplify our choice, so that there is no great risk that we have purchased the wrong type of grinding wheel, but in practice it will still be necessary to ascertain whether our choice was really the best. The fact is that although we can draw up rules for the selection of a suitable diamond grinding wheel, we still have to keep in mind that there are different conditions prevailing in every shop, and that these conditions may have a considerable effect on the results. In our shop, a medium sized one, it was certainly not a simple matter to find out which diamond grinding wheel should be preferred under certain conditions. After certain tests, during which the results are usually obtained indirectly, from the grinding machine operators or from the chargehands, it is some times difficult to know to which extent these statements are reliable. There is no shortage of skill in these cases, on the contrary, but these men are not really trained to collect reliable data over prolonged periods. Another method must be found, so that one can be quite sure of the test data. The tests are carried out on a universal tool grinder, which is constantly in use for the grinding of special hardmetal tools for woodworking, *etc.*, as follows. The operator is given detailed instructions. Every time that a grinding operation has to be carried out, the cutter to be ground is first accurately weighed, to an accuracy of 0.0001 grams, and the height of the diamond grinding wheel is accurately found as shown in Fig. 9, where the dimension X is found with an accuracy of 0.001 mm.

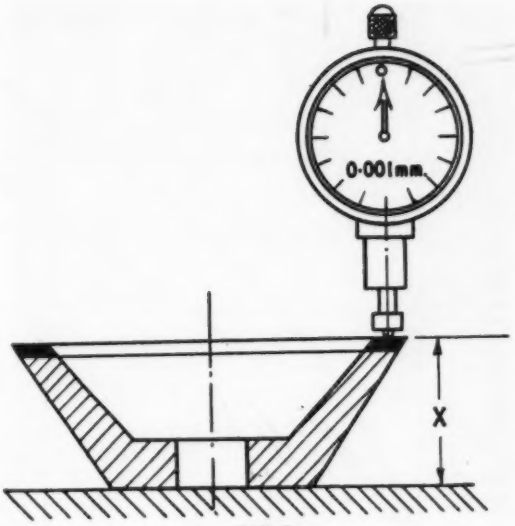


FIG.9

These data are ascertained at a central point, the measuring section or some other reliable department. After grinding, the same measurements are repeated, so that one is in a position not only to effect comparisons between wheels made by different manufacturers, but also to follow the life of a given wheel quite accurately. The operator is also instructed to note the grinding time required in each case. This is one of the least reliable data, and is also not a very important one. Nevertheless, the service life of the wheel and the quantity of hardmetal removed are data collected with a high degree of reliability, and conclusions can be drawn from them. It is clear that this method of checking practical results is the most reliable and least expensive one. The method of measuring the diamond grinding wheel, as shown in Fig. 9, is clear enough. The diamond wheel is placed on a plane surface and the height X is measured by means of a dial gauge to an accuracy of 0.001 mm. The measuring of the tools does not involve any difficulties, and can be carried out on any accurate balance. We must note here only that grinding must always take place under the same conditions, *i.e.*, the same machine, mist lubrication, and regular feed, with a maximum of 0.005 to 0.01 mm. Since the grinding surface thickness of the wheels in question (75 mm diameter) need not be taken as thicker than 2 mm, we have extended the graph of Fig. 10 (the horizontal line) for the wear of the grinding wheel only to 1.8 mm, which is generally almost the end of the grinding wheel. These observations were collected over several years, and the

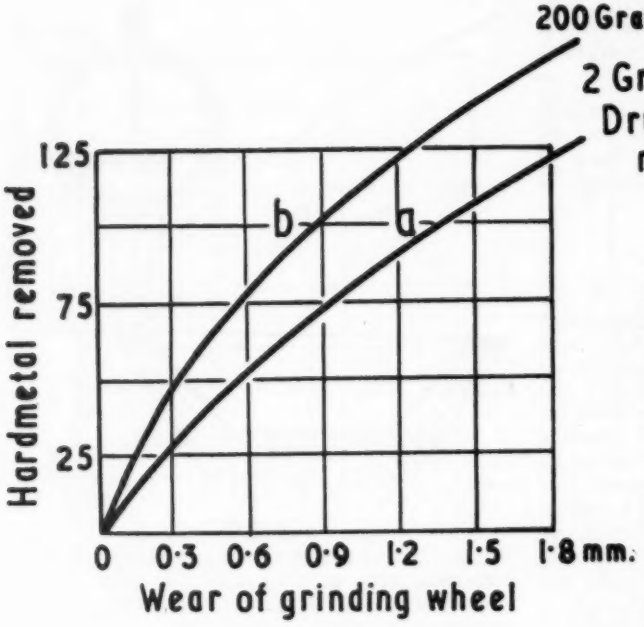


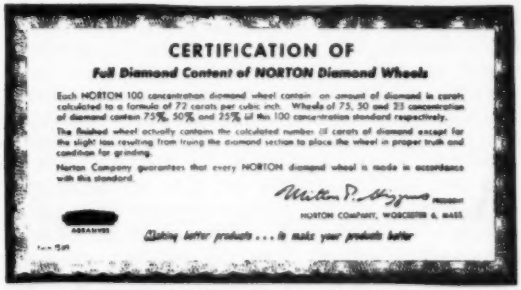
FIG.10

graph of Fig. 10 gives a brief summary of the results.

A comparison was made between a Winter diamond wheel, and one made by Drukker. We can see immediately that wheel 'a' has lost 1.8 mm, after 125 grams of hardmetal had been removed. On the other hand, wheel 'b' shows a wear of 1.8 mm after 200 grams of hardmetal had been removed. This means that wheel 'b' has a grinding efficiency 60% higher than wheel 'a.' We hope that this shows our readers not only how necessary it is to record definite observations in their own workshops, but also that these observations can be recorded in a fairly simple way, and without great costs. In practice it actually appears that such methods have a preventive effect. The users are more careful with their work and with the wheels, if we take so much care. For the suppliers this method is also more convenient, because the wheels are ordered on the basis of definite and positive data, which can be regarded as binding for both parties.

Since our graph in Fig. 10 shows data for European grinding wheels, we shall give here also a summary of the American notation for grinding wheels.

As with ordinary grinding wheels, the data are not always strictly in accordance with the stated code symbol, and vary with the different



CERTIFICATION OF

Full Diamond Content of NORTON Diamond Wheels

Each NORTON 100 concentration diamond wheel contain an amount of diamond in carats calculated to a formula of 72 carats per cubic inch. Wheels of 75, 50 and 25 concentration of diamond contain 75%, 50% and 25% of this 100 concentration standard respectively.

The finished wheel actually contains the calculated number of carats of diamond except for the slight loss resulting from truing the diamond section to place the wheel in proper truth and condition for grinding.

Norton Company guarantees that every NORTON diamond wheel is made in accordance with this standard.

NORTON COMPANY, WORCESTER 6, MASS.

ABRASIVES

Making better products ... to make your products better

manufactures. We have already mentioned above that the determination of the concentration is a very difficult problem which is almost impossible to carry out under practical

Sequence: I Grinding medium		II Grit size			III Hardness ness	IV Concentration	V Bonding material	VI Special bond	VII Thickness of diamond coating
Example	D		100		J	100	B	—	¼
D = diamond		(II)			(III)	(IV)	(V)	(VI)	(VII)
		30	100	180					
		36	100	320	soft-	low: 25	B Plastic	Letters or	1/32
		46	120	400	hard:	med.: 50	resin	numbers	1/16
		54	150	500	H J L	high: 100	M Metal	indicate	1/8
		60	180	600	N P R		V Ceramic	special	1/4
		80	220	800			H Hardmetal	bonding	
		90	240					effect	

conditions, so that this is a question of confidence between user and manufacturer. Naturally, we can form definite conclusions in practice on the basis of cutting performance and the service life. Nevertheless, it may be interesting to show here a copy of the certificate supplied by the Norton Company, the guarantee of the amount of the diamond material which must be present per cm^3, *i.e.*, of the concentration.

Practical hints for grinding with diamond wheels

Due to the various types of grinding work occurring under normal conditions: grinding of hardmetal-tipped cutters and other tools, the machine-tool industry has already for a long time developed special machines for these purposes. We shall briefly discuss here some examples, and show the considerable advantages arising from the use of these special machines. We shall not consider here the more recently developed methods, *i.e.*, grinding of cutters by

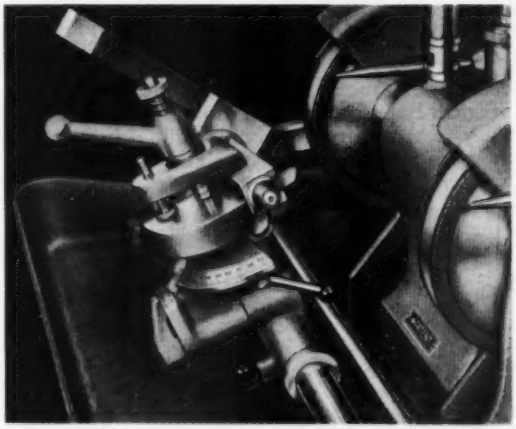


Fig 11.

ultrasonic methods, since these methods are still being developed.

A special grinding machine, which meets practically all requirements for normal workshops, will now be briefly described. One of the major advantages of these machines is that the bearings are so well arranged that the vibration of the diamond grinding wheels is fully absorbed, one of the foremost requirements for a good machine. The clamping of the tools is so firm, and they are held so well in all directions that the correct setting of the angle can be achieved by the operator without any difficulty, and no hand grinding is necessary. Also, the universal clamping arrangement improves not only the working speed, but eliminates also many difficulties in the operation of the machine, so that not only the tools can be clamped in

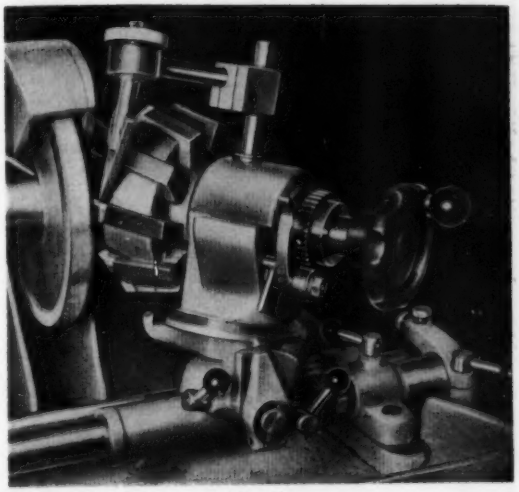


Fig 12.

the machine as shown in Fig. 11, but with the aid of a special clamping head, a cutter head or the like can be ground on the machine, as shown in Fig. 12. Fig. 11 shows also quite clearly that the machine presents the possibility of accommodating two diamond grinding wheels, an important matter because this improves the balanced running of the machine. Also the clamping method is shown quite well in the illustration, the tool is clamped with a single hand motion, and by the reciprocating motion of the cutter head the tool face is ground along the side edge of the wheel. The machine is cooled effectively, preferably with "Diamoil," a jet being directed at a high speed directly on the surface which is to be ground. The screening of the coolant, as well as the supply and removal of the coolant are arranged in such a way that

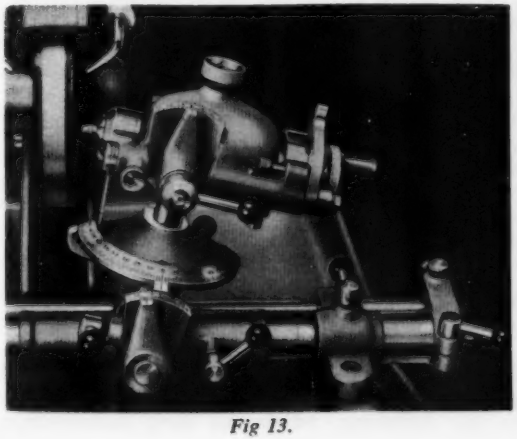


Fig 13.

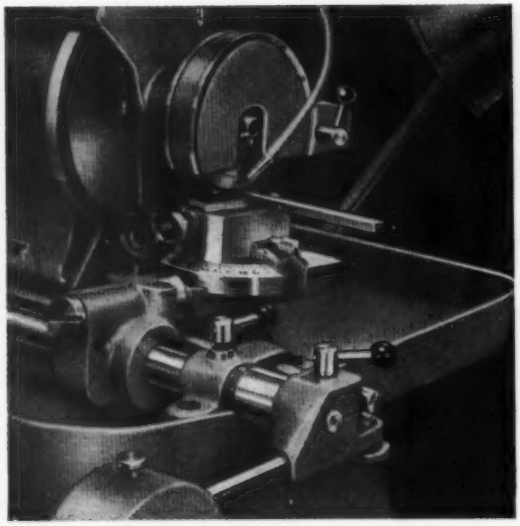


Fig 14.

the grinder is not inconvenienced, and there is no interference with the work, which is certainly an important feature. Fig. 12 shows the use of the universal adapter, a milling cutter which is to be ground on a universal grinding machine can still be machined here with practically the same accuracy. Fig. 13 shows a special clamping head with collet chuck, which enables centre drills and other types of drill to be ground.

For the grinding of chip breakers a special spindle is provided on a grinding attachment, as shown in Fig. 14. A small diamond wheel employed specially for this purpose is accommodated on this attachment. The fine setting and the good clamping method as well as the fact that the work can be easily supervised are all factors which render this machine indispensable for the grinding of hardmetal tools. On this machine a metal-bonded diamond wheel has been in use every day for over five years, before it had to be renewed. As already mentioned above, we prefer to use metal-bonded grinding wheels on this machine. The grit size, which we discussed in some detail above, is preferably taken as D70 for this machine, which is also an advantage, so that only one type of grit has to be used, since the work can be controlled more easily when only one grit size is being used.

Special diamond wheels type "S" and grinding points

Before we leave our diamond grinding wheels for the time being, we must briefly deal with a special use of the diamond grinding process. In the following article we shall discuss the correct selection of the truing diamond in more detail, together with its special uses. At the end of this series of articles we shall deal with the special grinding of hardmetal-edged work supports for centreless grinding; a special method has been developed for this purpose which has turned this costly machining process into an economical one. Cutting with diamond grinding wheels is still a method which takes much time, particularly in the case of difficult jobs, where much hardmetal has to be removed, and it may become very expensive, if for some special reason silicon carbide cannot be used. For this type of work a special small wheel or point has been designed, where the diamond grains are arranged in one layer, and face outward. Fig. 15 shows one of these diamond grinding points coated with a normal layer impregnated with diamond. Fig. 16 shows what is called the "S" method. The grains are here directed by electric means in such a way that all grains point to the outside. It is obvious that these small wheels or points have a very good efficiency, and work quite quickly. They have been found most suitable for the grinding out of small holes of dies on the jig drilling machine. They not only remain cool while grinding, but they are also much cheaper, and they are therefore much more economic to use than the normal types. These types have no disadvantages other than that they are easily injured. The slightest vibration, or even excessive feed may cause the entire diamond layer to disappear suddenly. This is obvious if we consider that the single layer with the diamond points, although it has a good cutting ability, is also easily displaced, which is not possible with the normal

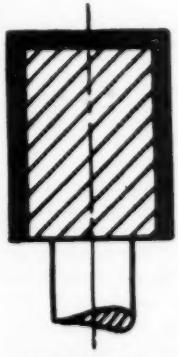


FIG.15

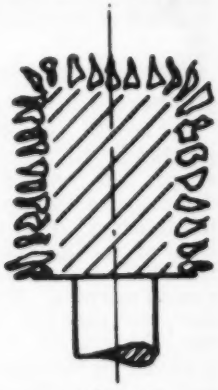


FIG.16

Continued on p. 79

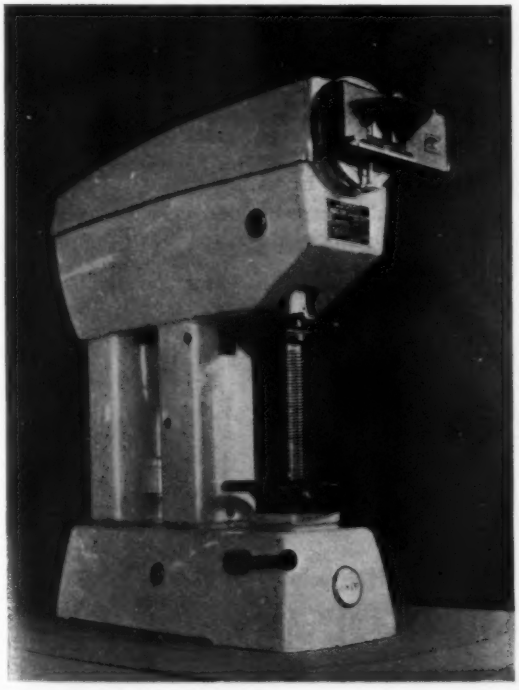
Engineering, Marine, Welding and Nuclear Energy Exhibition

There are about 523 firms and organisations exhibiting at the Engineering, Marine, Welding and Nuclear Energy Exhibition, being held at Olympia, London, W. 14, until May 4th.

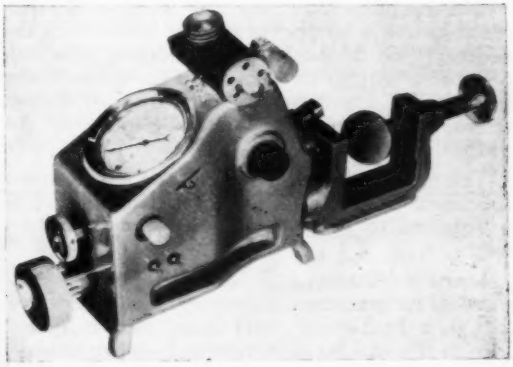
Few firms are exhibiting industrial diamond products, although one or two are showing hardness testers and, one, a new tungsten carbide reamer which can be retipped when worn.

W. & T. Avery Ltd are showing their type 6406 Vickers diamond pyramid tester, which incorporates a number of new features. It has a capacity of 120 kg and a dual magnification microscope—350x for very high reading accuracy on small impressions and the standard 70x; an improved shutter-type reading device operated by a digital micrometer enabling the size of impression to be read off rapidly, is claimed to reduce operator fatigue. There is also provision for projecting the image on to a screen.

Type 6406 hardness tester being shown by W. & T. Avery Ltd.



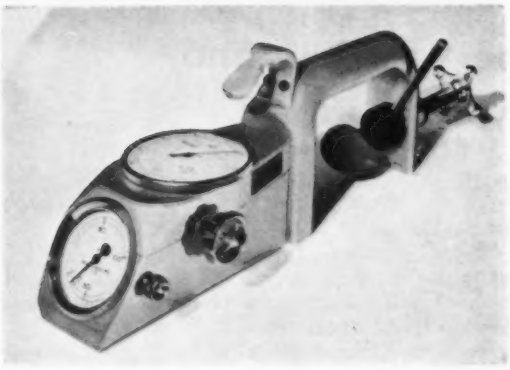
Ingersoll Locks Ltd Industrial Division are exhibiting the Pentrascope and the Indentometer, both using diamond indenters. The Pentrascope Mark VIII hardness tester will make on-the-spot tests of thin metal strip or heavy components and assemblies weighing several tons. It is provided with a 136° diamond indenter, a number of interchangeable clamps including a chain, for applying it to large diameter workpieces, and Rockwell and Brinell conversion tables.



The Pentrascope being shown by Ingersoll Locks Ltd Industrial Division.

Direct Rockwell readings are obtained from the Indentometer, another on-the-spot tester; this is equipped with a 120° spherical-tipped cone diamond penetrator and a $\frac{1}{16}$ inch diameter steel ball and a number of clamps, including an electro-magnet for taking readings from awkwardly shaped ferrous metal specimens.

A. & S. Osmond Ltd manufacture machines for cutting metallurgical specimens. These machines are the 3M7—with 3 hp motor, using a 10 inch diameter by $\frac{3}{32}$ inch wide rubber-bonded grit disk, and the 5M8, which is powered with a 5 hp motor and uses a 12 inch diameter by 3/32 inch wide disk. The disks are water-cooled during cutting to avoid overheating and consequent spoiling of specimens.



On-the-spot Rockwell tester being shown by Ingersoll Locks Ltd Industrial Division.

Diamond cutting disks have not been used by the manufacturers as they say that grit wheels have cut hard metal satisfactorily.

The machines have large area work tables with tee slots and a number of clamps for holding the ordinary run of work. It is possible, however, for special fittings to be used on the tables, there being a 7 inch clearance between disk (when raised) and table on the 3M7 and 8 inches on the 5M8.

The manufacturers claim that the finish on cut specimens is of such high order that little work is required to make them ready for laboratory tests.

Marwin (Anstey) Ltd have produced a taper-shanked tungsten carbide reamer, the ' Maxi-life.' It has a high-speed steel body and tungsten-carbide tip, which can be renewed—when worn—at approximately 65% of the cost of a new reamer.

There are 41 sizes of reamer, from 1/4 inch to 1 inch, with either right-hand, left-hand or straight flutes; those from 1/4 inch to 3/4 inch going up in graduations of 1/64 inch, and those from 3/4 inch to 1 inch in 1/32 inch graduations.

Osmond 5M8 metallurgical cutting off machine.

Airtools & Accessories Ltd are showing the ' Bux ' light-weight heavy-duty magnetic drill press. There are several models of this machine using high-speed or tungsten-carbide drills from $\frac{1}{4}$ inch to $1\frac{3}{4}$ inches in diameter.

A powerful electro-magnet, with a maximum force of 2,000 lb., holds the drill press in position on the work; the maximum drill point pressure is 1,250 lb. Each drill press is fitted with a radial positioner swivelling laterally through 330°, with $\frac{7}{8}$ inch lateral movement for accurate positioning.

Professor Opitz's Silver Jubilee

Professor Dr. Ing. H. Opitz has been celebrating his Silver Jubilee as Professor of the Department of Machine Tools and Scientific Management and of the Laboratory of Machine Tools connected with this department of the Technische Hochschule (Technical University) of Aachen, Germany. We should like to take this opportunity of congratulating Professor Opitz, and to wish him many more years of successful work.

Rubber-Bonded Wheels

This article, based on information provided by the Weldon Roberts Rubber Company, is principally concerned with the requirements of the amateur gem cutter. This is a hobby which is very widespread in the United States, but has not as yet become very common in the United Kingdom. However, it seems probable that following the general tendency for American customs to be taken up some years later in Europe, that developments in this line can be expected before very long. Furthermore, the techniques and equipment described have other uses beside those for which they were strictly developed and accordingly some of the information which is included in this article is likely to be of interest to a fairly wide circle of readers.

In the training of amateur lapidaries one of the processes that has been less satisfactory has been that of sanding gemstones, which is normally the intermediate process between the roughing grinding which brings the stone to shape and the final polishing processes, and is designed to produce a surface that is reasonably smooth, so that the final process can be carried out fairly quickly. In the earlier methods the process was carried out with sandcloth on disks or drums, but this was subject to a number of disadvantages.

First—a fresh sanding cloth was much too sharp to remove scratches.

Second—a partly worn cloth was better but the cutting texture did not remain constant for any length of time. As the cloth became duller, remaining scratches in the stone became more determined to remain.

Third—with many stones, wet sanding is preferred. Here again cloth sanding is not very suitable.

Fourth—the firmness of the padding underneath the sanding cloth had a great influence on results. The padding that was suitable for agate was impractical for jade. It meant that one would either have to alter the padding for various type stones, or else have a collection of

COMPENTRAD LTD

FOR

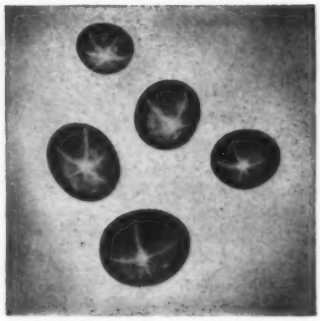
DIAMOND IMPREGNATED TOOLS

CONTINUOUS RIM CUTTING DISCS - SEGMENTED DISCS UP TO 3.METER DIAMETER - GRINDING WHEELS - CUP WHEELS - STRAIGHT WHEELS - PENCIL EDGING WHEELS

THE BEST TOOL FOR THE JOB

TEL. MONARCH 1257
9768
9769

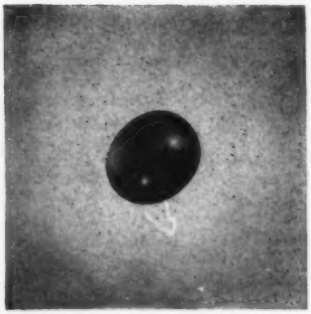
31, THROGMORTON STREET
LONDON, E.C.2



Examples of the type of gems that can be produced by the rubber-bonded wheel technique.

Left :—Five fine star rubies ; final polishing was done with sub-micron diamond powder.

Right :—A garnet cabochon.



ready-made wheels with padding of varied firmness.

Fifth—in classrooms the wear factor of the sanding cloth is extremely great, which results in a great deal of delay in changing sanding cloths.

Sixth—in the average classroom there is not enough equipment available for all the necessary types of sanding drums or wheels.

One improvement in this process has been brought about by the development of rubber sanding wheels specially adapted for this purpose. These were developed from ordinary industrial rubber sanding wheels, and are considered to be sufficiently versatile to be used for almost every type of gem sanding.

The versatility of these sanding wheels is one of their salient features. Used as wet sanders, they render their maximum cutting action. All the surface grit is clean and is exposed to the gemstone in the sanding operation. On the other hand, if the wheels are used dry the gemstone bearing on the wheel partially burnishes the surface, which in turn produces a finer finish on the stone. In other words, by using the wheels wet or dry, or a combination of both, they will respond to all types of sanding contingencies. The two rubber sanding wheels are actually equivalent to four or more. Another wonderful feature is that one side of the wheel may be reserved for sanding the crown of the gemstone, while the other side may be used for sanding flat surfaces. The changeover from one wheel to another is very simple.

Using a vertical arbor type of lapidary machine fitted with a 5 or 6 inch diameter wheel, of ½ inch thickness, speeds of approximately 1100 rpm are considered to be most suitable, and a similar speed should be used for a horizontal arbor machine mounting a similar size wheel of ¾ in. thickness is used. The advantages of this type of wheel for these particular operations, include, in particular, the fact that wear of the wheel (unlike wear of the sanding cloth) does not alter the cutting characteristics, because the wheel is impregnated throughout, unlike the cloth which is merely coated. In addition these wheels are virtually self-cleaning and self-sharpening and extremely economical in use. Moreover their long life reduces very considerably the time during which the machine is out of operation for changing the wheel. This is an advantage which applies just as forcibly in a school where the facilities are often limited, as in a factory where down time is an expensive item.

The final polishing process applied to these gemstones depends on their hardness and may be either a relatively soft abrasive such as tin oxide or as hard as diamond powder. Using these methods it is possible to produce fine gemstones even from material as hard as ruby or sapphire.

NEW TECHNICAL COLLEGE IN NORTHERN IRELAND

Birmingham Sound Reproducers Limited are to set up a technical college in Londonderry, Northern Ireland, to train production engineers, time study engineers, toolmakers, and future executives of the company.

Amongst the equipment to be provided will be machine tools of all types including such items as Deckle die sinking machines and Société Génévoise jig borers and jig grinders. The college will be conducted on the lines of the apprentice schools of some of the larger companies such as Rolls Royce and Joseph Lucas.

It has been announced in Johannesburg that De Beers will shortly be starting commercial scale production of synthetic diamonds. We hope to be able to give further details in a later issue.

Industrial Diamond Association Annual Convention

The 16th Annual Meeting of the Industrial Diamond Association of America held its technical sessions on Wednesday, March 15 at Hollywood, California. It was attended by about 60 leading members of the industry, who heard papers by Carl Highberg and John H. Olsen of Engelhard Hanovia Inc on the subject of 'Furthering the use of diamonds in industry through research into new fields and development of existing applications,' and a second paper by Norman A. Matthews of General Electric on the subject of 'New applications for diamonds, including an analysis of reasons for current restricted usage patterns.' A third paper by Messrs. R. G. Weaving, A. L. Linholm and A. R. Roy of the Diamond Research Laboratory, Johannesburg, was entitled 'A comparative method of evaluating the strength of diamond grits.'

New officers elected for the following year were:

Leopold H. Metzger, Super-Cut Inc, Chicago—President;

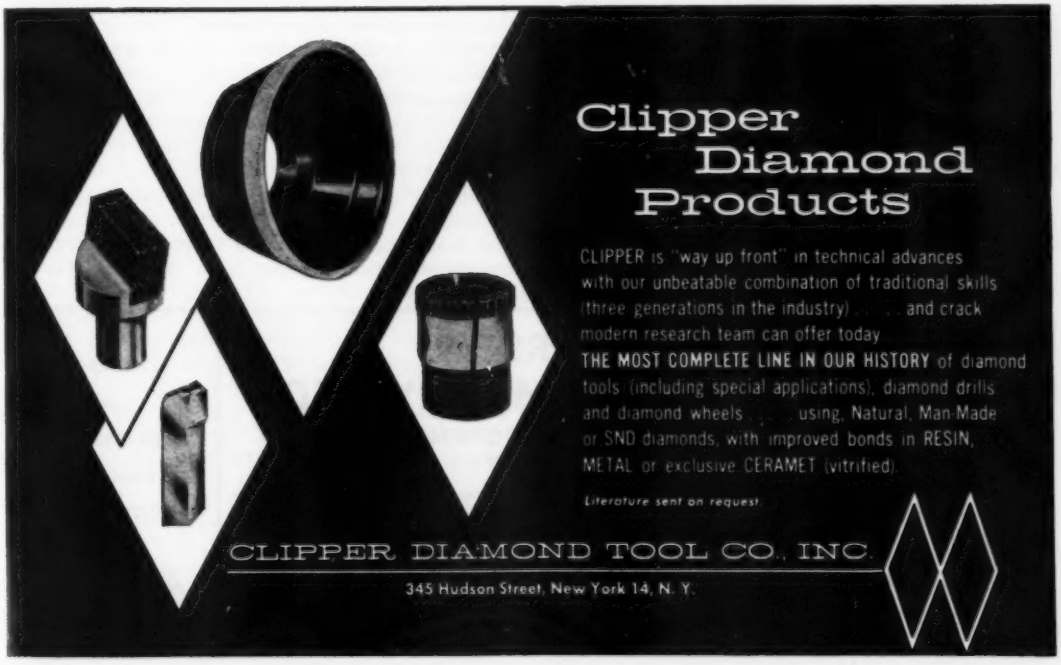
Charles Baumgold, Diamond Tool Research Co Inc, New York City—First Vice-President;

Eric J. Schneider, Engis Equipment Co, Chicago, Ill.—Second Vice-President.

The Officers' Reception and dinner were held on March 13. During the Convention special awards were presented by the outgoing President to the members who were concerned with the IDA Exhibition at the ADTME Show at Detroit and other awards were made by Mr. Jolis to Mrs. McGinnis, the Executive Manager and Mr. A. D. Leveridge the former Executive Manager.

A number of other subjects, including the revision of certain of the standards applicable to diamond tooling were discussed, and a new public relations scheme was put into operation.

Broken Hill is one of Australia's major sources of lead and zinc. In this mining city, in western New South Wales, powerful drills will soon start biting deep into the earth, almost immediately below the city's main shopping area.


Clipper
Diamond
Products
CLIPPER is "way up front" in technical advances with our unbeatable combination of traditional skills (three generations in the industry) . . . and crack modern research team can offer today
THE MOST COMPLETE LINE IN OUR HISTORY of diamond tools (including special applications), diamond drills and diamond wheels . . . using, Natural, Man-Made or SND diamonds, with improved bonds in RESIN, METAL or exclusive CERAMET (vitrified).
Literature sent on request
CLIPPER DIAMOND TOOL CO., INC.
345 Hudson Street, New York 14, N. Y.

A spokesman for one of the mining operators said the company had bought land less than half a mile from the main street where it planned to erect diamond drilling equipment.

The mining operators will be searching for new ore deposits since reserves are slowly dwindling. Drilling for the new reserves will go down between 3,000 and 4,000 feet.

Mining Congress

This month 350 top mining executives, consultants and their wives from the Commonwealth and Europe arrived in Johannesburg for the 7th Commonwealth Mining and Metallurgical Congress, opened on April 10. Over 1,000 delegates will attend and, by May 7, more than sixty technical papers will have been read.

Special trains will take delegates to the De Beers Consolidated Mines, Kimberley, and to the Orange Free State goldfields; while an air-fleet of two Dakotas, two Skymasters and two Vikings will carry parties to Consolidated Diamond Mines at Oranjemund in S.W. Africa; to the Tsumeb Corporation copper mines; to Windhoek and Etosha Pan; to the S.A. Manganese 'Hotazal' mine; to Iscor's iron ore mine at Sishen (Northern Cape Province); and to Cape Asbestos property at Koegas.

Twelve special trains, fleets of planes and a large number of buses will take visitors to mining and industrial sites from the Cape to Northern Rhodesia, and visits will be organized to Sasol's oil-from-coal plant, its Sigima colliery and the Iscor works at Vanderbijlpark; the Messina copper mines; the Consolidated Murchison antimony mines in Northern Transvaal; to the Witbank collieries; to the Eastern Transvaal asbestos, goldmining and other properties.

Technical papers presented will cover most aspects of South African mining, mining engineering, *etc.*, as well as pioneering and research achievements.

News from all Quarters

The South African firm Joy-Sullivan (Africa) Pty Ltd has received from Canada an order for the largest type of diamond core drill in existence, which is only manufactured in Johannesburg. The drill concerned in the Joy No 50 core drill, capable of cutting a 2 inch hole vertically to a depth of 12,000 feet. This model machine was largely responsible for the drilling of the Orange Free State and Far West Rand gold fields.

Earlier this year a British company ordered the Joy No 45 drill, which is also only manufactured in the Union.

Last year Joy-Sullivan (Africa) Pty Ltd exported 106 underground mining machines from its Steeldale, Johannesburg works. Last January, the company received orders for 32 underground machines from abroad.

The enterprise first entered the export field seven years ago and now exports regularly to Australia, France, the Philippines, Peru, Nicaragua, Austria, Italy, Germany, Algeria, and a number of other African States and Territories.

It was recently reported from Kimberley that excitement was running high on the Ghaapse

THE HENDERSON DIAMOND TOOL COMPANY LTD.,

43-45 ALLESLEY OLD ROAD, COVENTRY

Telephone : Coventry 75617

MANUFACTURERS OF DIAMOND TOOLS.

ALL TYPES OF ABRASIVE DIAMOND TOOLS

RESET AND RETURNED WITHIN **48 HOURS**

OF RECEIPT AT THE ABOVE OFFICE.

TOOLS FOR SPECIALISTS MADE TO CUSTOMERS OWN REQUIREMENTS

Berg, situated about 70 miles from Kimberley, as rumours would have it that rich diamond reserves had been discovered there.

It was further reported that options had been taken on a number of farms, and that some farmers were looking for capital for the purpose of starting prospecting operations.

The diamond deposits were stated to be contained in fissures which are similar to the rich diamond fissures at Bellsbank where the yield is about £40,000 a month on average.

Writing in 'Pravda' recently, the president of the USSR Academy of Sciences, Academician Alexander Nesmeyanov, referred to artificial diamonds in an article entitled 'Science and the Roads Ahead.'

He stated that the synthesis of super-hard substances, harder even than carborundum or such widely used carbides as tungsten carbide, carries the possibility of tremendously increasing metal-cutting or well-drilling speeds. These needs are met by the artificial synthesis of diamonds and the equally hard, man-made Borazon. On the agenda for crystal-chemists there is also the synthesis of such industrially widely used materials as mica, rock crystal, asbestos and purely artificial mineral fibrous materials.

Many types of crystals serve as semi-conductors in the latter's now so important uses. They are used for a variety of electro-technical and radio-technical purposes, insulators, piezoelectrics, polaroids for various sections of the spectrum and light filters. All of them are obtained artificially through synthesis.

In many cases the more important aspect is not the arrangement of atoms into molecules but the arrangement of crystals into a solid. This is the case with metals and their alloys. This technology, so familiar in metallurgy, should be applied extensively in the sphere of synthetic organic high-molecular compounds (polymers). We could then expect a great advance in the hardness of these new materials, which are capturing the market said Nesmeyanov; an advance similar to the one that took place in going over from primary metal to modern grades of steel.

An agreement has been reached between Universal Diamond Co Ltd, of Unidex Works, Cross Lane, Hornsey, London, N.8, and Bullock Research Laboratories, of Newent, Gloucestershire, whereby Universal Diamond Co. Ltd become sole distributors for the resin-bonded and metal-bonded diamond wheels manufactured by Bullock Research Laboratories.

Application of Industrial Diamonds III

(*Concluded from p. 72*)

type of grinding wheel. However, we are well aware of all these possibilities, and can carry out tests, if necessary, although some experience is necessary in this connection. It can easily be shown that anyone who has no experience with grinding with diamond wheels of the normal type will not be very successful with the "S" type wheels, and will only be disappointed with them. One must also keep in mind that the "S" wheels and points can also be used for the grinding of shank material. This is naturally a considerable advantage in the machining of certain tools.

ENDECOTTS
TEST SIEVES
For Accuracy!

POCKET INTERCHANGER SIEVES

'ENDROCK' TEST SIEVE SHAKER

TEST SIEVES
B.S. 410: 43 U.S. Standards and Tyler Equivalents

We operate a Recovering Service

Consistent mechanical action—
saves valuable time of skilled personnel

ENDECOTTS (FILTERS) LTD. Phone: LIBerty 8121/2/3
Dept. 4/A Lombard Rd., London, S.W.19. Grams: Endfilt, London

CLASSIFIED ADVERTISEMENTS

2d. a word, minimum 4/-. Box Numbers 1/- extra. Address Box No. replies to : N.A.G. PRESS, LTD., 226 Latymer Court, London, W.6.

TIME RECORDERS.—Sales—Rental Service. Tel. HOP. 2239. TIME RECORDER SUPPLY & MAINTENANCE CO. LTD., 157/159 Borough High Street, London, S.E. 1.

MR. M. DAVIDSON, F.S.M.C., qualified opthalmic optician, is in constant attendance, for sight-testing and dispensing of optical prescriptions, at the HATTON OPTICAL CO., 19 Hatton Garden, E.C.1. (Tel. HOL 8193).

JEWEL BEARINGS for watches, precision industries and the jewellery trade—high grade quality—very competitive prices. Sawing, drilling, enlarging, turning, recessing of synthetic ruby and sapphire, germanium and other hard materials. We are interested in being represented in other countries. S. I. CARDANA, ORNAVASSO (NO.), ITALY.

DIAMOND POWDERS, purity 98% +, recovered from diamond cutting and polishing powder (0 — 40 micron) for $2 (U.S.) crt. DIACEM, Schupstraat 9, ANTWERP, BELGIUM.

RECOVERY OF DIAMOND from used grinding wheels, etc., carried out on percentage basis. BOX 2111.

DIAMOND POWDERS mesh and microns, purity 98/99%. Also recovered diamond powders 0-40 micron available at the price of US $1.95 per carat. Point and Splinters. **AFRIKA DIAMANT BOART, VESTINGSTR. 53, ANTWERP, BELGIUM.**

IF YOU WANT TO KNOW what is going on in the diamond industry ask to be put on the mailing list of *HABIT NEWS*, a journal which is published quarterly by HABIT DIAMOND TOOLING, LTD., Lurgan Avenue, W.6.

CASH ! Highest prices paid for diamond fragments and used boart. DIAMOND EXCHANGE & MART, 57 Aspenlea Road, W.6.

WANTED: Toolmaker's microscope, second-hand, Taylor Hobson microscope bodies, goniometer and similar equipment. Best cash prices paid. DIAMOND EXCHANGE & MART, 57 Aspenlea Road, W.6.

YOU WANT THE BEST JOB — WE HABIT. You have the skill — we need it. Apply HABIT DIAMOND TOOLING, LIMITED, Lurgan Avenue, W.6.

OPTICAL MEASURING PROJECTOR wanted, preferably large field. Model 25 x magnification. HABIT DIAMOND TOOLING, LIMITED, Lurgan Avenue, W.6.

WE ARE LOOKING for the men who are looking around for somebody else's job. The chance of a lifetime is in store for the administrator, technician, metallurgist, physicist, yes, and a maintenance man too!—who can do the work better than it is being done at present. Fellows with a specialised gift are required to join those already possessing the gab! Apply HABIT DIAMOND TOOLING, LIMITED, Lurgan Avenue, W.6.

ADVERTISERS' INDEX

	Page
Clipper Diamond Tool Co. Inc.	77
Compentrad Ltd.	75
Diamant Boart	62
Diamond News, The	80
Drukker, D. & Zn. N.V.	64
Endecotts (Filters) Ltd.	79
Habit Diamond Tooling Ltd.	Cover III
Henderson Diamond Tool Company, Ltd., The	78
Impregnated Diamond Products Ltd. ...	Cover IV
Indusmond (Diamond Tools) Ltd	63
Industrial Diamond Co. (Sales) Ltd. ...	Cover II
Smit, J. K. & Sons (Diamond Tools) Ltd. ...	61
Triefus & Co. Ltd.	Cover I
Wolverhampton Diamond Die & Tool Co. Ltd.	63

● PUBLISHERS : N.A.G. PRESS, LIMITED
226 Latymer Court, Hammersmith, London W.6, England Telephone : RIVerside 2143

Contributions of scientific, technical and practical interests and news items are invited, but responsibility cannot be accepted for the safety of MSS, drawings, photographs or other matter submitted. Unaccepted matter will be returned.

Information of Rates and spaces available for Trade Advertisements will be forwarded on request. I.D.R. is published monthly on the 18th at 1/3 a copy. It is obtainable through Newsagents and Booksellers, or by Postal Subscription, 15s. a year post free, from the Publishers' address above.

Subscriptions in U.S.A $2.50 are received by the usual U.S.A. Subscription Agencies or direct from the Publishers, address as above.

INDUSTRIAL DIAMOND ABSTRACTS

Industrial Diamond Information Bureau,
2 Charterhouse Street, London, EC 1.
Telephone : FLEet Street 1577

1961 Volume 18
APRIL

DIAMOND MINING AND INDUSTRY

Valedictory address to the Symposium ' Modern practices in diamond mining in Southern Africa '

W. S. Findley. *J S Afr Inst Min & Metall* 1961 Vol 61 (7) pp 367-368 (Feb)

The ten papers presented indicate that the most modern methods in diamond mining and recovery are being used. The great value of Sir Ernest Oppenheimer's work in building up the present marketing arrangements is mentioned and the increasing use of diamonds in industry is stressed. Also dealt with is the ability to synthesize industrial diamonds on a commercial basis and the scale of prospecting for national diamonds now in progress.

E *Eb Hd.361/F.251.361/Fh Ha.25.361*

Diamond through the ages

E. Hardy. *Gemmologist* 1961 Vol 30 (355) pp 39-40 (Feb)

This is a brief historical outline dealing with gem diamonds and superstitions attached to them, cutting and polishing diamonds, the discovery of various diamond fields, et cetera. *L* *F.28*

Mystery of the Siberian Platform

V. Osipov, rev by M. M. Kaplun. *Priroda* 1960 Vol 49 (10) pp 109-110 (Oct) ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3344 (Jan) (Original in Russian)

E *Eb.33*

Diamond mining in Yakutia

Anon. *Gemmologist* 1961 Vol 30 (355) pp 23-26 (Feb)

Under the current 7-year plan Yakutia will become one of the world's biggest diamond mining areas. Some developments that have taken place and are still taking place are described, including transport provision of food, et cetera. It is expected that many more kimberlite pipes will be found, but many of them will contain few if any diamonds. Brief descriptions of the terrain, climate, and mineral layers of the ground are given. 1 illustr, 2 ref. *L* *Ebb Hd.332*

Need of collective publicity for polished diamond

H. E. Slijper. *Diamant* 1961 Vol 4 (29) pp 21-22 (Feb) (In English, French and Flemish)

Proposes the establishment of a foundation to advertise diamonds, financed by diamond organizations and interested governments. *E* *F.222*

Diamonds in Europe

V. O. Rizhitsky. *Priroda* 1960 Vol 49 (11) p 27 ; *Insdoc List* 1961 Vol 8 (2) col 168 (Jan 16) (Original in Russian)

D *Eb.12.32*

Market reports

H. Wins & coll. *Diamant* 1961 Vol 4 (29) pp 24-31 (Feb) (In English, French & Flemish)

Reviews polished, rough, and industrial diamond markets. Also reports on New York, Tel-Aviv, Zurich-Geneva, London, Toronto, Amsterdam, Paris, Rome, Frankfurt and Hong Kong. *E* *F.251*

Canadian Machinery and Metalworking 1961 Directory : Sources of supply for the metalworking industry of Canada

Anon. *Canad Mach* 1960 Vol 71 (12) pp 497-592 (Dec)

The first part includes a list of suppliers of diamond tools and industrial diamonds. The second part gives addresses of companies in alphabetical order.

D *Fc.343.56/N.343.56*

Diamond : Israel

Anon. *Miner Tr Notes* 1961 Vol 52 (3) p 14 (Mar)

The new diamond centre sponsored by the Government-controlled Diamond Development Corporation, the Jerusalem Economic Corporation, was opened in Jerusalem at the end of 1960. The diamond industry of Israel is expected to expand considerably.

L *F.25.351*

Diamond sales at new record

Anon. *Min J* 1961 Vol 256 (6556) p 427 (Apr 14)

De Beers has announced that it will no longer give separately the values of the sales of gem and industrial diamonds. A new high record for the overall diamond sales (for the first quarter of 1961) has been announced. The organisation is running a promotion campaign for industrial diamonds. *L* *F.25*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND

Production of synthetic diamonds

M. N. Godlevskii. *Geol rud mestrorozh* 1960 (5) pp 125-128 (Sep-Oct) ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3149 (Jan) (Original in Russian)

E *Fh Ha*

CONTENTS

Diamond Mining and Industry...	A97	Rock Drilling	A106
Physical, Chemical, and Mechanical Properties of Diamond	A97	Wire Drawing	A106
Physical, Chemical, and Mechanical Properties of Hard Materials	A98	Grinding and Polishing of Carbides and Metals	A107
Diamond, etc, in Instruments	A99	Machining Processes and Developments ...	A112
Hardness and Wear Testing	A100	Production, Grading and Recovery of Abrasive Particles	A112
Truing of Grinding Wheels	A101	Tool Production...	A113
Precision Machining of Metals	A103	Powder Metallurgy	A114
Cutting and Machining of Stone, Glass, etc ...	A105	Miscellaneous	A114
Gem Polishing	A106	Book Reviews	A115
		Trade Literature	A115
		Patent Lists	A116

Colour and artificial colouration in diamonds. Farbe und künstliche Farbänderung von Diamanten

E. Gübelin. *Dtsch Goldschmiede Ztg* 1961 Vol 59 (2) pp 59-62 (Feb) (In German)

Possible causes of colour in diamonds are considered, and a number of processes discussed by which diamond colour can be induced or changed. To be continued. 4 illustr. *A* *F Gb/F Gbz*

The synthetic diamond (III). Der synthetische Diamant (III)

E. Gübelin. *Gold u Silber* 1961 Vol 14 (2) pp 21-23 (Feb) (In German)

An explanation of the difficulties involved in obtaining larger stones is followed by a discussion of the growth and structure of the crystals and some theories already put forward. It is noted that the nature of the raw material used determines the type and number of diamonds, while their shape and colour depend on the temperature. Some striking structural differences between natural and synthetic diamonds are mentioned. 6 illustr, 1 table. *A* *Fh Ha*

Study of the surface states of diamond and graphite by a simple MO-LCAO method

J. Koutecky, M. Tomasek. *Phys Rev* 1960 Vol 120 p 1212 ; *Insdoc List* 1960 Vol 7 (24) col 1944 (Dec 16)

E *Bhb Ubm Vw/F Ubm Vw*

Precious stone and a wonderful worker

N. Kuftyreva. *Ovt na vop trud* 1960 (118) pp 8-12 ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3149 (Jan) (Original in Russian)

E *Fc/Kb*

Artificial diamonds

A. A. Meniailov, N. P. Popov. *Priroda* 1960 Vol 49 (9) pp 90-91 (Sep) ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3149 (Jan) (Original in Russian)

E *Fh*

Thermal expansion of diamonds between 25 and 750° K

S. I. Novikova. *Sov Phys—Solid State* 1961 Vol 2 (7) pp 1464-1465 (Jan) (Original in Russian)

Two natural diamond crystals were studied, measurements being made in the directions corresponding to the maxima dimensions, equal to 4.63 mm in one and 7.25 mm in the other. Results are given. A graph shows experimental values for the linear coefficient of thermal expansion of diamonds. 1 illustr, 9 ref.

D *Fd Udc Vw*

Concerning the zone structure of diamond-type crystals

A. A. Nran'yan. *Sov Phys—Solid State* 1961 Vol 2 (7) pp 1494-1499 (Jan) (Original in Russian)

D *Bdf Ubb*

The temperature dependence of the electrical conductivity of diamonds

K. N. Pogodaev. *Sov Phys—Solid State* 1961 Vol 2 (7) pp 1317-1321 (Jan) (Original in Russian)

Describes an investigation carried out by the author. Six samples were selected from Yakutsk diamonds with sufficiently plane surfaces for electrical measurements to be made. Methods and results of measurements are outlined, the latter being discussed under three sections : (*i*) the electrical conductivity of diamonds not subjected to X-rays ; (*ii*) electrical conductivity of X-ray irradiated diamonds ; and (*iii*) depolarization currents in diamonds. A discussion and a summary of conclusions are given. 5 illustr, 2 tables, 8 ref.

D *F Uec Vw*

The application of synthetic diamonds for technical purposes. Die Verwendung künstlicher Diamanten für technische Zwecke

M. Reishaus. *Masch-Markt* 1959 Vol 65 (103/104) pp 57-58 ; *Techn-Wiss Ber Osram* 1961 Vol 33 (5) p 199 (Jan 15) (In German)

A *Fh.1451.25*

Radiation defects in crystals

L. S. Smirnov. *Sov Phys—Solid State* 1961 Vol 2 (7) pp 1512-1513 (Jan) (Original in Russian)

Diamond, germanium, and silicon are the specific materials mentioned. The author develops the assumption that such elements as germanium and energies are exceptionally well defined. For diamond the limiting energy is found to be slightly higher than for silicon, assuming diamond's melting temperature to be about 3,800 deg Centigrade. The author's conclusions are quoted. *D* *Bfr Vpz/Bhc Vpz/F Vpz*

Electron-spin resonance of nitrogen donors in diamond

W. V. Smith, P. P. Sorokin, J. L. Gelles, G. L. Lasher. *Phys Rev* 1959 Vol 115 (6) pp 1546-1552 ; *Techn-Wiss Ber Osram* 1961 Vol 33 (5) p 199 (Jan 15) (Original in English, Abstr in German)

A *F Gc*

Diamond-studded iron ?

Anon. *New Scientist* 1961 Vol 9 (221) p 349 (Feb 9)

A certain type of iron, melted under a pressure of 70,000 atmospheres, and after cooling slowly from 2,000° C, became exceptionally hard, comparable to some of the superhard alloys. It was suggested that possibly this is because the treatment produces minute crystals of diamond from the carbon present in the iron ; this explanation is as yet purely speculative. 1 illustr. *E* *Bfc Ckz Vcb:Fh Ha.21*

Diamond-makers made the earth's core too cold

Anon. *New Scientist* 1961 Vol 9 (225) p 595 (Mar 9)

In the course of their project to make synthetic diamonds, General Electric deduced a temperature of the liquid core of the earth, which is said to be too low.

L *Fh Ha*

BP 840,770 **General Electric Co**

(Aug 29, 1955—conv date, USA)

Diamond synthesis

This method for converting non-diamond carbon into diamond eliminates the need for determining the temperature at which conversion takes place. A mixture of non-diamond carbon and a catalyst (metal of Group VIII other than platinum, chromium, tantalum, manganese) is subjected to at least 75,000 atm. pressure and a temperature sufficient for conversion. The electrical resistance of the mixture is measured and heat applied for a sufficient time to cause an inflexion (marked change in the rate of change) in the electrical resistance. BP 830,743 is referred to. (7 claims, 1 illustr). *J* *Fh Ha.545*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF HARD MATERIALS

New spectroscopies in metallurgical research : Experience with an X-ray fluorescence spectrometer and a solids mass spectrometer

K. M. Bills. *Metallurgia* 1961 Vol 63 (375) pp 45-52 (Jan)

8 illustr, 4 tables. *D* *Vwl Wcq.131*

X-ray determination of crystal structures

P. B. Braun, A. J. van Bommel. *Philips Techn Rev* 1960/61 Vol 22 (4) pp 126-138 (Feb 16)

The article deals with the principles underlying X-ray diffraction, discussing the relation between the structure and the diffraction patterns, and how the one can be derived from the other. By way of illustration, examples of structures determined in Eindhoven are discussed, special mention being made of work on a substance from a class of magnetic materials known as ferroxplana. 12 illustr. 14 ref.

D *Vhc*

The physical examination of metals

B. Chalmers, A. G. Quarrell. *BSCRA Abstr* 1961 Vol 10 (1) pp 28-29 (Jan)

Book, Edward Arnold (Publishers) Ltd, London, 1960, 2nd rev ed, 917 pp. Price £8 8s.

This new edition contains in one volume accounts of all the principal physical techniques for the examination of metals, apart from radiography.

[Not in library of Industrial Diamond Information Bureau]. *D* *Bf Vwg*

The value of the abrasion resistance factor

M. Kuderko. *Cutting Tool Engng* 1961 Vol 13 (2) pp 20-21 (Feb)

The abrasion resistance of carbide is the property which, by itself, comes closest to approximating actual cutting or wear conditions. In conjunction with other properties, such as hardness and strength, it can be extremely useful. Tests and their usefulness are outlined. 2 illustr. *E* *Bk Ungc*

Influence of pressure, temperature and mechanical grinding, on the appearance of surface-martensite. Über den Einfluss von Druck, Temperatur und mechanischem Schleifen auf das Entstehen des Oberflächenmartensits

A. Masín, O. Bakalíková. *Acta tech hung* 1961 Vol 32 (1/2) pp 247-259 (In German, summary in English)

In the present work the influence of pressure, annealing temperature till 1250° C, under cooling till −78° C and −193° C and mechanical grinding on the appearance of surface martensite is studied. It was proved, that neither the pressure itself nor undercooling or annealing cause the appearance of surface martensite and do not change (till 1000° C), the martensite formed earlier. A direct proof is given that the cause of the appearance of surface martensite is mechanical grinding. 12 illustr. *W* *Bfd Chc Unf*

Boron : element of promise

A. G. Massey. *New Scientist* 1961 Vol 9 (223) pp 484-485 (Feb 23)

Borazon, boron nitride prepared in the diamond form, is reported to be as hard as diamond while surpassing diamond in heat stability, being unaffected by temperatures in the region of 2,000° Centigrade. Borazon should therefore find use in the manufacture of very high speed tools: As yet it has been produced only in very small quantities. 3 illustr.

E *F*Re*

REQUESTS FROM AMERICA

American readers who wish to order a photostat or reprint of an article abstracted in Industrial Diamond Abstracts are advised to apply directly to the appropriate journal if this is an American publication.

Surface structure, surface properties, and the understanding of form deviations (waviness and roughness). Über die Oberflächengestalt, den Oberflächencharakter und die Erfassung der Gestaltabweichungen (Welligkeit und Rauheit)

H. Nitsche. *Din Mitteilungen* 1961 Vol 40 (1) pp 11-15 (Jan 15) (In German)

Discussion of the extension of existing standards to meet modern requirements.

A *Uhm.21*

What happens when cutting edges dull

P. J. White. *Mach Tool Blue Bk* 1961 Vol 55 (1) pp 88-93 (Jan)

A series of tests was run to determine micro-inch standards for cutting edge and chip contact surfaces, with the object of assuring uniform production at high speeds with minimum downtime. Charts show (*i*) a composite of tool specifications and tool performance records based on actual runs; (*ii*) effect of tool wear on surface and the necessity for establishing surface finish specifications on each surface; (*iii*) dimensional tolerance changes with surface finish changes; and (*iv*) concentricity of parts in relation to surface finish. 7 illustr. *W* *Pd Unr.1341*

Identifying precious stones (XXV). Wir bestimmen **Edelsteine (XXV)**

Anon. *Gold u Silber* 1961 Vol 14 (2) pp 32-33 (Feb) (In German)

Continuing the list of precious stones and their properties. *A* *Bb Ccb.514*

Cemented [sintered] borides have potential for future cutting tools

Anon. *Commonwealth Engr* 1960 pp 49-50 (Aug 5): *Pera Bull* 1961 Vol 14 (1) p 11 (Jan)

Describes properties in various applications.

D *Ceg Rfb*

DIAMOND, ETC, IN INSTRUMENTS

Length measurement by dynamic technique

R. G. N. Hall, V. W. Stanley *Mach Lloyd* 1961 Vol 33 (4A) pp 27-31 (Feb 25) (In English, abstr in German and French)

The technique is illustrated by the calibration of a diffraction grating mounted on a fine thread lathe used for scribing very fine helices on brass bars. 11 illustr, 7 ref. *L* *Ceqbd Pr Qdd Tfd*

Linear measurement by transducer

Reilly Engineering Ltd. *Metalworking Prod* 1961 Vol 105 (7) p 71 (Feb 15)

A new system of high-accuracy linear measurement and position control uses transducers which measure linear displacement in conjunction with a null indicator. The system can be used in conjunction with machine tools, including milling machines, jig borers, lathes, forging presses, et cetera. 1 illustr.

D *Pr Wp*

Introduction of diamond knife

T. Sakai, S. Arakawa. *J Electronmicroscopy* 1960 Vol 9 (1) pp 61-63; *Instrum Abstr* 1961 Vol 16 (2) p 150 (Feb) (Original in Japanese)

The use of a diamond knife for ultra-thin sections is described and illustrated. *D* *Nfm*

BP 836,768 **General Electric Co**
(Dec 27, 1957—conv date, USA)

Phonograph stylus

It has been found that shanks of titanium or zirconium have certain advantages compared with previously used metals such as iron, nickel-iron alloys, beryllium-copper. *Eg* titanium has a much lower thermal coefficient of expansion, it yields readily by plastic flow so that it tends to self-relieve stress set up between shank and diamond and as an active metal it facilitates the

Fig 1. BP 836,768.

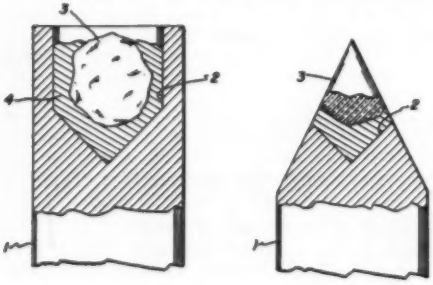
bond with the diamond with the result of a strong joint. The stylus is light, has good frequency response, low record wear, and is readily mass-produced without undue shrinkage. Fig 1 shows diamond 3 in a drilled out pocket of titanium rod 1 embedded in a granulated nickel solder 4. (4 claims, 5 illustr).

J *Nfs.545/Te.545*

BP 836,283 **General Electric Co**
(Dec 27, 1957—conv date, USA)

Method of manufacturing phonograph styli

The method has been devised to make use of irregular shaped gems, in particular diamonds after difficulties have been experienced in obtaining bonds of sufficient strength to prevent breakage during the final grinding stage. The gem is first set in a holder shown in Fig 2 made from a rod of iron or molybdenum 1 with a recess 2 in which the diamond 3 is bonded using granulated solder (silver or silver-lead) after painting the stone with a slurry of powdered titanium hydride in a fugitive binder. The diamond is then ground to



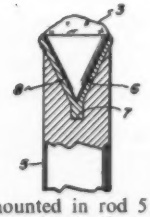


Fig 2 (top left), 3 (top right), and 4 (left). BP 836,283.

the shape shown in Fig 3. The stone is then removed by heating and the shaped portion of the diamond mounted in rod 5 shown in Fig 4. This rod (of iron, iron-nickel alloys, beryllium-copper alloys) forms the shank of the finished stylus and may have a dia of 0.02 in. As all stones to be mounted will have a similar size and shape uniform bonding conditions are provided for a strong bond using pure silver solder in vacuo at 960 deg C. The exposed portion is then ground and polished to a radius of approx 0.001 in. and the shank cut to a length of 0.07 in. (5 claims, 5 illustr).

J *Te.545*

BP 838,504 **Radio Corp of America**
(Dec 20, 1955—Conv date, USA)

Phonograph pickup

Phonograph pickups should produce a voltage high enough to eliminate the need for several preamplifier stages and also should be responsive to the amplitude rather than the velocity of the stylus travel. Piezo-electric crystal pickups possess these characteristics but tend to produce noise in amplifiers and are limited in their upper frequency range because of high mechanical impedance. Magnetic or reluctance pickups have a low output impedance and can be designed for a low dynamic mechanical impedance but magnetic pickups respond to the velocity of the stylus motion. A variable reluctance pickup producing high output voltage and responds to the amplitude of stylus travel with low output impedance and low dynamic mechanical impedance is obtained by modulating the magnetic flux in accordance with the displacement of a vibratile element using a semi-conductor wafer (of germanium) in the flux path so that its plane is at right angles to magnetic lines of force. The stylus is provided with a sapphire or a diamond having a tip of a diameter of 0.001 for use with long-playing or micro-groove records. (4 claims, 3 illustr).

J *Te.545*

HARDNESS AND WEAR TESTING

Portable manually operated hardness tester. Tragbarer-Handhärteprüfer

Dorernst Ennio Doriguzzi u Alfred Ernst, Bad Homburg, Lange Melle 11, Germany. *Industriekurier* 1961 Vol 14 (17) p 58 (Feb 1) (In German)

The instrument is for use on horizontal or vertical, plane or curved surfaces with diameters of 10 mm or more. It is pressed against the surface by hand, and the degree of hardness can be read immediately. It works under the same conditions as the Rockwell, Brinell and Vickers testers. *A* *Wgh*

The diamond pyramid hardness of sodium borate glasses as a function of their composition and heat treatment

F. C. Eversteijn, J. M. Stevels, H. I. Waterman. *Phys Chem Glasses* 1960 Vol 1 p 134 ; *Brit Ceram Abstr* 1961 (1) p 18A (Jan)

E *Bmz Unhcc*

Measurement of hardness at very high temperatures

L. M. Fitzgerald. *Brit J appl Phys* 1960 Vol 11 p 551 ; *Insdoc List* 1961 Vol 8 (3) col 196 (Feb 1)

E *Cv Vbb*

Surface roughness measurement

D. A. Parker, C. K. V. Owen. *AEI Engng Rev* 1960 pp 126-129 (Sep) ; *Pera Bull* 1961 Vol 14 (1) p 9 (Jan)

New techniques developed for examination of surfaces by interferometry are described.

D *Unf Vr.1456*

Microhardness and other properties of magnesium compounds with the calcium fluoride system

E. R. Petty (Aluminium Labs Ltd). *Nature, Lond* 1961 Vol 189 (4759) pp 132-133 (Jan 14)

A diamond pyramid indenter under 50 gm load was used to test a freshly polished surface of each of the compounds studied. 2 illustr, 1 table, 4 ref.

D *Bfxb Cvdb Ndc*

The properties of plasma-sprayed materials

M. A. Levinstein, A. Eisenlohr, B. E. Kramer. *Welding J* (USA) 1961, Vol 40 (1) pp 85-135 (Jan); *Engrs Dig* 1961 Vol 22 (2) pp 83-86 (Feb)

Hardness values of tungsten and molybdenum were obtained with a Vickers hardness tester, using a 1 kg load and specimens which were metallographically mounted and polished. Other materials tested for Vickers hardness included cerium, zirconium and hafnium oxides. 5 illustr, 4 tables.

D *B Cvd Nde*

Hot hardness values in relation to the physical properties of metals

E. R. Petty, H. O'Neill. *Metallurgia* 1961 Vol 63 (375) pp 25-30 (Jan)

Hardness tests with a Vickers diamond pyramid indenter at elevated temperatures and using modified machine have been made at various metals and alloys. The hot hardness tester is described and results of tests recorded. 12 illustr, 26 ref, 1 table.

D *Bf Cvd Nde Vbb Wghc*

TRUING OF GRINDING WHEELS

Grinding wheel dresser has double cutter unit

Desmond-Stephan Mfg Co, Urbana, Ohio. *Amer Mach* 1961 Vol 105 (5) p 136 (Feb 6)

The Duplex is designed for dressing and truing straight faced grinding wheels used on flexible shaft and portable grinders. 4 to 8 in. diameter wheels need not be removed from their spindle. The revolving grinding wheel is cradled between the cutter units for a few seconds and the face of the wheel is dressed straight. 1 illustr. *E* *Ab Cg Psf*

Improving surface finish in centerless grinding

A. Rakestraw. *Grinding & Finishing* 1961 Vol 7 (2) p 17 (Feb)

To improve finish of a Cincinnati No 2 centreless grinder, using 57A60-L5-VBE grinding wheels for grinding 52100 steel for various types of gauges, it was suggested that a lustre-type diamond mounting should be used for dressing. It is suggested that several diamond points in contact with an abrasive wheel produce a much finer dress than a single point diamond.

E *Chcc Pr Psf:Njd Unf*

Tool dresses complex wheel shapes to 'tenths'

Tracaform Corp, 11380 Kaltz, Warren, Mich. *Grinding & Finishing* 1961 Vol 7 (2) p 56 (Feb); *Tool & Mfg Engr* 1961 Vol 46 (2) p 163 (Feb)

The model SMD-704 spindle mounted contour wheel dresser is a 1 : 1 ratio template tracing wheel dresser, designed to fit most surface grinders using a 7 in. diameter wheel or less and to dress them to an accuracy of ten thousandth of an inch. It is claimed that it is not necessary to use lapped diamonds; they may be of any shape or size as long as they enter the form being dressed. 1 illustr.

E *Chcm Pr Psf:Nj/Ab Csh Nj Psf*

'Wickman-Scrivener' surface grinder. Machine à rectifier les surfaces planes 'Wickman-Scrivener'

Anon. *Mach Mod* 1961 Vol 55 (623) p 76 (Feb) (In French)

Model 824 incorporates a special Diaform dressing device. 1 illustr. *A* *Chcm*

Orcutt spline grinder modified for operations on longitudinal ball tracks

Gear Grinding Co Ltd, Shirley, Warwicks. *Machinery, Lond* 1961 Vol 98 (2520) pp 511-512 (Mar 1)

For grinding longitudinal ball tracks in components for Birfield constant velocity universal joints, this 20 in. spline grinding machine is equipped with a special wheel dressing device for dressing the wheel to the required elliptical profile for grinding the ball tracks; the diamond is swung in a circular path, the vertical plane of which is inclined at the required angle to the direction of table traverse. An ellipse is thus produced, the minor axis of which conforms to the width of the wheel. 2 illustr. *E* *Chc Pr Psf:Njb*

BP 837,262 **K. Hack**

(Aug 14, 1957—conv date, Germany)

Apparatus for the automatic setting of the trueing tools for the grinding disks of spring-end grinding machines

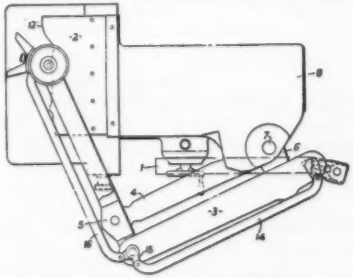
The adjustment of the truing tools in spring-end grinding machines is usually carried out by hand. As the distance between the working faces of the grinding wheel is decisive for the correctness of the spring this adjustment requires an extraordinary amount of experience. The described device is characterised by a combination of the truing tools (star wheels) with sensing means which measure the position of their working surfaces relatively to pre-set limit stops and effect a corresponding adjustment of the tools, a further sensing means measuring the wear of the working surfaces of the truing tools to cause a wear compensating movement of these tools. (11 claims, 1 illustr).

J *Az Chc Pr Psf.545*

BP 839,526 (Apr 2, 1958) **H. S. Hallewell**

Forming apparatus for profile grinding wheels

The tool carrier has two main parts. One part is journalled in a mounting for angular movement about an axis but not movable in the direction of this axis, and the second part which is the tool holder is connected to the first part so as to be incapable of angular movement relative to the first part but capable of adjustment parallel to the axis. The pantograph mechanism as seen in Fig 5 and 6 comprises links 3, 4 (front) and 5, 6 (side). 11 is the stylus bearing against template 2. The follower member is mounted in housing 13 and coupled by rod 14. The tool holder 24



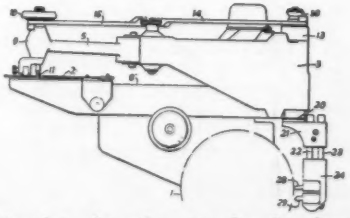


Fig 5 (top) and 6 below. BP 839,526.

is vertically adjustable through slides 22, 23 and carries two diamond tools 28, 29, one intended for coarse forming, the other one for fine forming. (5 claims, 3 illustr). *J* *Abm Cg Psf.545*

BP 840,083 (Jan 14, 1959) **O. E. Saari, Illinois Tool Works**

Worm forming apparatus

The apparatus is designed for forming helical threads having constant tapered leads. Hitherto such apparatus maintained constant angular relationship between work and tool with the result that the shape of the thread profile varied with the diameter of the thread. The new apparatus produces threads with constant profiles. If the thread is ground the grinding wheel may be of comparatively large diameter which cannot be used when the angular setting is fixed. The truing device operates with two angular adjustable slides each carrying a diamond tool for truing the flanks and the periphery of the profiled wheel. (6 claims, 8 illustr).

J *Adz Ceq Pr.545*

BP 840,085 **H. -J. Strunck, Wernicke & Co KG** (Feb 6, 1958—conv date, Germany)

Device for truing grinding wheels, particularly grinding wheels for grinding the bevel edges of spectacle lenses

The member carrying the truing tool is traversed by a threaded spindle while held under spring pressure in permanent contact with a profiled bar. The spindle may be mounted in a casing with a cover which carries the truing tool, the cover being connected to a nut sliding on the spindle. The connection by a fork on the nut and a projection on the cover permits also transverse movement of the spring held cover while slidably displaced axially so as to follow the contour of the profiled bar. (6 claims, 3 illustr).

J *Ab Cgh Psf.545*

BP 840,422 **F. F. L. Morgan, Holman Brothers Ltd** (Aug 29 ; Nov 25, 1955)

Dust extraction systems for rotary abrasive tools

A roller is in contact with the surface of the work and mounted to yield so as to conform to the contours of that surface. This roller intercepts dust particles leaving the working face of the tool tangentially. A suction mouth collects these particles stopped by the roller. The dust extraction head may carry a truing tool and head and tool thus can be adjusted together the truing tool acting as stop. The arrangement is intended mainly for portable hand grinders, swing-frame grinders and stand grinders. (12 claims, 2 illustr).

J *Chc Pe Pr Qz Ty.545*

BP 844,109 (May 13, 1958) **L. A. Turner, Gear Grinding Co Ltd**

Means for trimming toothed gear grinding wheels

The truing device has to impart to the wheel side faces 36 complementary to the tooth faces and a periphery

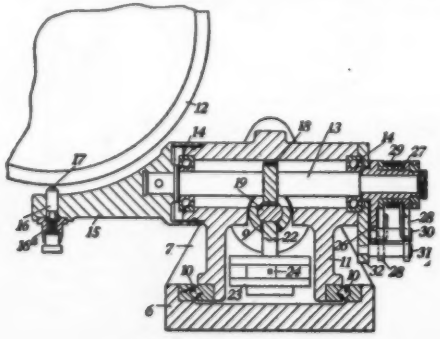


Fig 7. BP 844,109.

33 corresponding to the root space as in Fig 7. Fig 8 and 9 show the base 6 with end walls 7 and accurately adjustable stops 8. Slide 11 on rollers 10 moves parallel

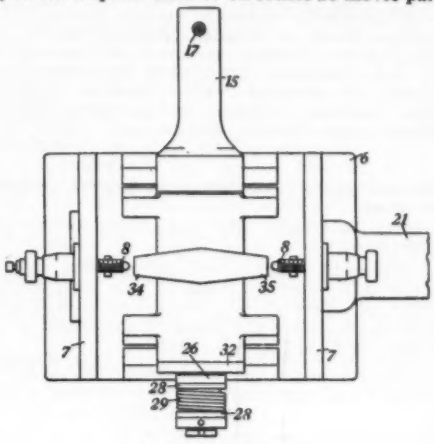


Fig 8. BP 844,109.

with the axis of the grinding wheel 12. Spindle 13 carrying diamond 17 is turned when pinion 18 is moved by rack 19. Rack 19 is fluid actuated by a piston in cylinder 21. 24 are micro-switches controlling the fluid

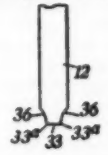


Fig 9. BP 844,109.

flow to cylinder 21. Spring 29 prevents rotation of spindle 13 until one of the stops is encountered when the rotational movement begins. (4 claims, 5 illustr).

J *Abmd Cgz Pfz.545*

DAS 1,083,697 **Durndell True-Path Ltd** (May 11, 1951—Conv date, Gt Britain)

Pantograph truing device. Pantographen-Abrichtvorrichtung

In manually operated devices there is usually a handle on the feeler for moving the feeler along the edge of the template. This handle serves also for turning the feeler to contact the template at the proper angle. This angular adjustment is simultaneously transferred by a gear mechanism to the truing tool. As the pressure exerted by the operator is varying the feeler point moves in an oscillating path and the profile to be trued then does not correspond exactly to the profile of the template. This is remedied by inserting a joint with axial and radial play between feeler and mechanism and providing a second handle for swinging the tool independently of the handle guiding the feeler along the template. The device may be used for machining any disk like workpiece with a diamond, a tungsten carbide, a steel tool according to a template. (3 claims, 5 illustr). Ref cited : 2 GP ; 1 BP ; 1 Swiss P.

J *Abm Cgf Psr.545*

LITERATURE REQUESTS

When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

DAS 1,083,150 (Mar 13, 1954) **W. Darby, Stuart Davis Ltd**

Feeding device for the crushing roller for profile grinding wheels. Zustelleinrichtung für eine Abrichtwalze für Formschleifscheiben

The pressure of a crushing roller along *eg* a thread grinding wheel may become excessive when moving over the edges at the ends of the profile and then may cause portions to break out. This danger is avoided by arranging the crushing roller on a pivotable arm

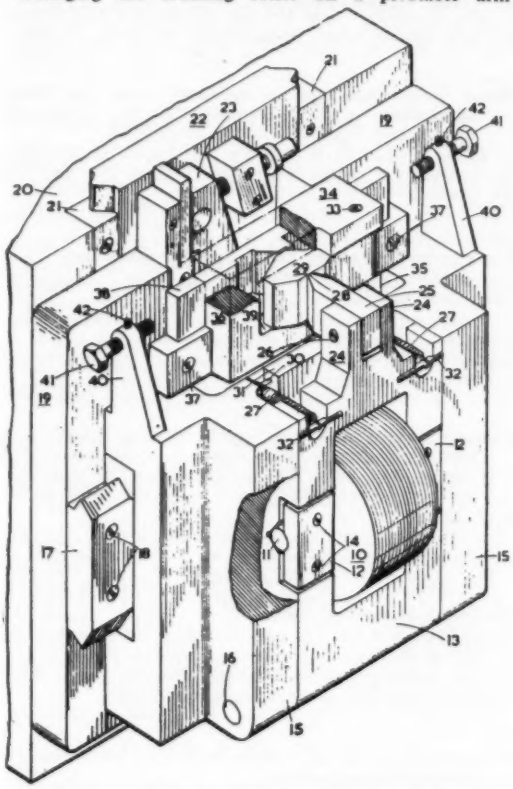
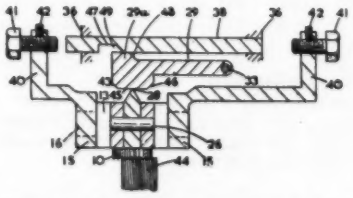


Fig 10 (above) and 11 (below. DAS 1,083,150.



mounted on the horizontal slide carrying the crusher assembly the arm being held under spring pressure against a control device consisting of a pivotable latch arm and a shiftable control bar as shown in Fig 10 where the crushing roller is 10, the latch arm 29 and the control bar 38. In Fig 11 the pivotable arm holding the crushing roller is 13 urged by springs 27 against latch arm 29. (5 claims, 5 illustr). Ref cited : 2 GP ; 1 BP ; 1 Swiss P : 2 USP.

J *Ab Cgh Psf.545*

PRECISION MACHINING OF METALS

Carbide inserts up tool life and down machining time

Adamas Carbide Corp, Kenilworth, NJ. *Tool & Mfg Engr* 1961 Vol 46 (2) p 154 (Feb)

Grade 434 carbide inserts are claimed to have lengthened tool life and reduced machining time in a gear blank cutting operation. 1 illustr.

L *Ceq Pdcb Uqe*

Hydraulic clamping cuts over-all machining time

W. M. Exely. *Tool & Mfg Engr* 1951 Vol 46 (2) pp 79-82 (Feb)

5 illustr. *L* *Ceq Pr Psz*

High-production gun drilling

C. Christen. *Tool & Mfg Engr* 1961 Vol 46 (2) pp 83-84 (Feb)

Gun drilling gives a combination of high speed and accuracy that suits it to high production operations. Using several gun drilling operations at General Motor's Detroit Diesel Div, as examples, the author shows how this process is put to work in modern manufacturing plants. 2 illustr.

L *Cfbn*

Routing cutter introduced

Dixie Tool Industries Inc, Bridgeport, Mich. *Cutting Tool & Engng* 1961 Vol 13 (2) p 36 (Feb)

A new solid carbide routing cutter is designed to work on the hardest of modern materials and still maintain keen cutting edges longer. It can, it is claimed, be sharpened at a fraction of its original cost. 1 illustr.

E *Al Bk Chc/Ba Ceg Pdc*

Gun drilling unit has two spindles

Drillmation Co Inc 6500 E. Eleven Mile Rd, Center Line, Mich. *Tool & Mfg Engr* 1961 Vol 46 (2) p 157 (Feb)

The dual spindle gun-drilling power unit is suited for machining workpieces that lend themselves to close centre fixturing. Finished holes can be drilled in one pass on a production basis. Infinitely variable feed rates can be co-ordinated to operate with spindle speeds up to 10,000 rev/minute. 1 illustr.

L *Cfbn Pr*

Boring machine has long stroke

Foote-Burt Co, Cleveland 8, Ohio. *Tool & Mfg Engr* 1961 Vol 46 (2) p 157 (Feb)

This hydraulic feed, one-way three-spindle vertical line-boring machine has a 48 in. stroke. The boring head travels on vertical square ways, with 0.0005 in. accuracy over the entire 4 ft travel. After boring the tools retract and the indexing fixture revolves discharging the workpiece. 1 illustr. *L* *Cfd Pr*

How up-to-date . . . is your job analysis ?

H. Frommelt. *Cutting Tool Engng* 1961 Vol 13 (2) pp 10-14 (Feb)

Specifies the ten basic steps in the proper analysis of any chip removing operation and discusses them. 1 table. *E* *Ceq Vu*

Results of high power and ultra high speed metal working. Ergebnisse bei Hochenergie- und Ultrahochgeschwindigkeits-Bearbeitungen von Metallen

E. O. Genzsch. *Maschinenwelt u Elektrotechnik* 1961 Vol 16 (2) pp 45-53 (Feb) (In German)

A general article in which high power processes, ultra high speed cutting processes and machines and tools for high speeds are discussed. 12 illustr, 3 ref.

A *Bf Cegz*

Cutting tools : The ABC's of speed and feeds : Parts I & II

H. Frommelt. *Mach Tool Blue Bk* 1961 Vol 55 (1) pp 79-80 (Jan) ; Vol 56 (2) pp 103-104 (Feb)

Describes a method of establishing the correct cutting speed for a lathe turning operation. Selection of the proper feed rate has a direct bearing on : (*i*) the surface finish of the work ; (*ii*) the power required of the machine tool ; (*iii*) the useful life of the cutter. Single-point, multiple-tooth, and step-machining operations are covered. *W* *Ceqb Pr Uqfb*

Economical accurate hole-making in exotic metals

W. H. Hampton, W. R. Shaw. *Grinding & Finishing* 1961 Vol 7 (1) pp 38-39 (Jan)

A four year test programme has resulted in the introduction of the Metoram range of diamond-impregnated core bits and the new No 18 Buffalo drill press for joint use in drilling tungsten carbide and the exotic hard metals.

The first major test, making holes in tungsten carbide with the new diamond-impregnated coring tool, reduced hole drilling expense from $80.00 to $1.20. Succeeding test results confirmed that both the time and cost of such drilling operations can be drastically reduced. Cost figures are given for comparative tests on fired silicon carbide, beryllium oxide, high density aluminium oxide, and sintered barium and iron oxide ; costs were here reduced by an average factor of 3. A table shows the huge time savings gained when using the new method on eight grades of tungsten carbide. Samples were not damaged, nor did their surfaces deteriorate during tests. 2 illustr, 1 table.
W *Bf Cfb Nhe*

Five-sided throwaway inserts

Kennametal Inc, Latrobe, Pa. *Cutting Tool & Engng* 1961 Vol 13 (2) p 32 (Feb)

Five sided Kendex inserts with 10 cutting edges are used in new Kendex style KP tools ; they are regular pentagons with nose angles of 180° which, it is claimed, add strength to the cutting points. 1 illustr.
E *Pdcb*

Diamond tools—the various kinds, and their importance for precision machining of metals. Diamantwerkzeuge—ihre Formen und Bedeutung für die Oberflächen-Veredelung der Metalle

B. Kleinschmidt. *Metall* 1960 Vol 14 (1) pp 25-26 ; *Techn-Wiss Ber Osram* 1961 Vol 33 (5) p 174 (Jan 15) (In German)
A *Ceqz N*

Role of friction in metal cutting

S. Kobayashi, E. G. Thomasen. *J Engng Ind* 1960 Vol 82 p 324 ; *Insdoc List* 1961 Vol 8 (3) col 202 (Feb 1)
E *Bf Ceg Ung*

Studying the cutting process at superhigh speeds

V. D. Kuznetsov, G. D. Polosatkin, M. P. Kalazhnikova. *Fiz met i metalloved* 1960 (3) pp 425-434 (Sep) ; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3229 (Jan) (Original in Russian)
E *Cegz.21*

Engine lathe uses ceramic tooling

Lodge & Shipley Co, 3055 Colerain Ave, Cincinnati 25, Ohio. *Tool & Mfg Engr* 1961 Vol 46 (2) p 155 (Feb)

The Superturn is available in two models and has three speed ranges of 32 speeds. It is designed expressly for ceramic tooling. 1 illustr.
L *Ceqb Pdd Pr*

6 ways to cut costs with proper use of throwaway tooling

A. P. Goeppert. *Cutting Tool Engng* 1961 Vol 13 (2) pp 15-16 (Feb)

2 illustr. *E* *Ceq Pdcb*

Compact lathe handles all operations

Monarch Machine Tool Co, Sidney, Ohio. *Tool & Mfg Engr* 1961 Vol 46 (2) p 56 (Feb)

The model K lathe can perform all conventional turning, boring, facing and thread chasing operations. All US standard and US fine threads are included in the 48 thread range. Specifications are given. 1 illustr.
L *Ceqb Pr*

Metal wafers cut with a diamond knife, and their applications. Metall-Dünnschnitte mit Diamantmesser und ihre Anwendungsmöglichkeit

L. Reimer. *Phys Verh* 1959 Vol 10 (13/14) pp 200-201 ; *Techn-Wiss Ber Osram* 1961 Vol 33 (5) p 196 (Jan 15) (In German)
A *Az Bf Ceg Nfm*

Use of wax for holding honeycomb for machining

Temco Electronics & Missiles Co, USA. *Machinery, Lond* 1961 Vol 98 (2518) pp 359-361 (Feb 15)

Honeycomb material for aircraft and missile components is held during machining with the aid of a water-soluble wax. Various machining operations are described. 4 illustr.
D *Az Ceq Psc Ske*

Ceramic tooling and honeycomb brazing fixtures for supersonic aircraft production.

J. D. Walton jun, N. E. Poulos. *Am Ceram Soc Bull* 1960 Vol 39 (12) pp 740-748 ; *Ceram Abstr* 1961 Vol 44 (2) p 35 (Feb)

Ceramic brazing fixtures and tools were developed from rebonded fused silica.
E *Ceq Pdd*

Machining high-nickel alloys

Henry Wiggin & Co Ltd. *Metal Ind, Lond* 1961 Vol 98 (5) p 92 (Feb 3)

The company has produced a publication and a film on the machining of their high-nickel alloys.
D *Bfxp Ceq*

Machinability study of ceramic tools III. Tool wear in ultra-high-speed cutting

K. Yamada, N. Nakayama, H. Kajhara, S. Sakai, H. Mll. *Repts Govt Industr Res Inst, Nagoya* 1959 Vol 8 (2) p 74 ; *Brit Ceram Abstr* 1961 (1) p 12A (Jan) (Original in Japanese)
E *Ceqz Pdd Unr*

Reaming low carbon steel

Anon. *Pera Bull* 1961 Vol 14 (1) pp 3-6 (Jan)

The effects of reaming conditions, reamer shape, cutting fluid and reamer wear on hole accuracy and surface finish are described.
D *Bfd Cel*

Aluminium bullets test ultra-fast machining

Anon. *New Scientist* 1961 Vol 9 (222) p 408 (Feb 16)

High speed metal cutting processes have been studied at the Siberian Scientific Research Institute of Physics and Technology by shooting aluminium and duralumin specimens from a rifle. Cutting force, chip hardness and shrinkage, and depth of the work hardened layer under the machined surface are among factors studied at speeds of between 330 and 2,300 ft/second.
D *Bf Ceqz.1341*

Fundamentals of economic manufacture—22

W. F. Walker. *Tooling* 1961 Vol 15 (3) pp 37-47 (Mar)

Examines the various types of tools, fixtures, and other equipment used with the vertical boring mill. 16 illustr. *E* *Cfd Pr Psc*

Turret drilling—programmed production pays off

Anon. *Tool & Mfg Engr* 1961 Vol 46 (2) pp 113-114 (Feb)

More than 1/5th of all machining operations in this country are performed on drilling machines. Numerical control makes it possible to fully automate drilling operations. A dramatic reduction in drilling time and costs is claimed. 2 illustr.
L *Cfb Prz Wpz*

Ultra high speed machining

Anon. *Commonwealth Engr* 1960 pp 44-45 (Aug 5); *Pera Bull* 1961 Vol 14 (1) p 10 (Jan)

Discussion of investigations of high-speed machining up to 250,000 ft/minute. *D* *Ceqz.21*

Swiss P 346,182 (Nov 11, 1958) **M. Fallot, Dasa SA**

Method of decorating parts of horological pieces and apparatus for carrying out the method. Procédé de décoration d'éléments de pièce d'horlogerie et appareil pour la mise en oeuvre de ce procédé

The method is characterised by the use of a diamond for machining at least a portion of the surface of such parts to give them a high polish appearance. Fig 12 to 16 represent several types of decorations on automatic

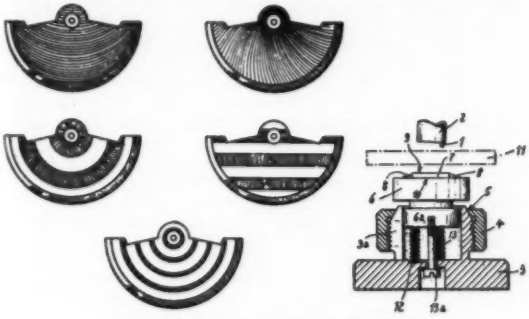


Fig 12 to 16 (left) and 17 (right).

winding masses. The parts as shown in Fig 17 *eg* part 7 are carried on an adjustable table 6 under a diamond 1 in a rotary holder. It is possible to use a diamond milling cutter which should then be of substantially smaller size than the greatest dimension of the work-piece. (7 claims, 7 illustr).
J *Qc Tlbb.545*

CUTTING AND MACHINING OF STONE, GLASS, ETC.

Manufacture and use of photosensitive glass

K. T. Bondarev, F. IA. Borodai. *Stek i ker* 1960 Vol 17 (10) pp 1-4 (Oct); *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3183 (Jan) (Original in Russian)
E *Thz:Qc*

Device for preparing accurately X-ray oriented crystals

W. L. Bond. *J sci Instrum* 1961 Vol 38 (2) pp 63-64 (Feb)

Describes a combined orienting-grinding device claimed to produce surfaces accurate to about two minutes of arc from plates within five degrees of proper orientation. An auxiliary device is said to enable production of surfaces of two minute precision from any crystal whatsoever. Procedure is explained. 3 illustr. *D* *Bd Chc Ubc:Psc*

Manufacture of precision aspheric surface

A. Cox. *Optical Society of American, Program of the 1961 Spring Meeting* 1961 Mar 2, 3 and 4 p 19

Two basic types of glass machining have been devised. The first involves the turning of glass with a single-point diamond in a tool of special construction. The second depends on the use of a high-speed diamond burr. With each type of machining a surface finish is produced which permits polishing in a short time without significant change in surface contour.
E *Bm Ceq Nhh/Bm Ceqb Nf*

Masonry saw blades use tungsten carbide bond

Diamond Tool Research Co Inc, 380 Second Ave, New York 10, NY. *Grinding & Finishing* 1961 Vol 7 (2) p 62 (Feb)

Pressure-tested diamond is said to increase the ability of the blades to take heavier cuts and cut more footage. The tungsten carbide bond is said to increase efficiency by preventing the bond from wearing down before the diamonds. A special raker design built into the rim is said to result in faster cutting and eliminates under-cutting by removing the chips of concrete. 1 illustr.
E *Bn Cej Ng Ure*

Electric glass cutter for general use

V. Krotkov. *Shkola i proizv* 1960 Vol 4 (10) pp 81-82 (Oct); *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3183 (Jan) (Original in Russian)
E *Bm Ceg Prd*

Reduced costs sighted through optical tooling

J. M. Miller. *Tool & Mfg Engr* 1961 Vol 46 (2) pp 103-105 (Feb)

Optical tooling gives greater measuring accuracy and reduces manufacturing and assembly costs. Examples are given to illustrate applications. 5 illustr.
L *Ceq Vfd Wc*

BP 836,794 SA des Manufactures des Glaces et Produits Chimiques de St-Gobain, Chauny & Cirey
(June 3, 1955—Conv date, France)

Method of and means for grinding and polishing glass sheets

The glass is rubbed with a rubbing tool which consists of a binder and hard grains (8-17%) distributed therein (carborundum grains in plasticised polyvinyl chloride) while further free abrasive grains of the same hardness are fed to the operating face of the tool, before the start of the polishing step. The rubbing step differs from the usual step carried out with a cast iron disc and an abrasive suspended in water in that no holes are formed in the glass surface which though very small produce a cracked sub-layer but that scratches develop which are much more easily removed by polishing. (8 claims, 1 illustr).
J *Az Bm Chc Pe.545/Az Bm Chm Pe.545*

BP 838,035 De Beers Consolidated Mines Ltd
(Apr 30, 1957—Conv date, South Africa)

Polishing hard crystalline carbon

See: USP 2,931,351. (11 claims, 8 illustr).
See *Industr Diam Abstr* 1961 Vol 18 pp 48-49 (Feb).
J *F Hp.545*

DAS 1,083,172 (Mar 6, 1956) **K. E. H. Lau, Ernst Winter & Sohn**

Tubular drill for glass and other hard material. Rohrförmiger Bohrer für Glas und anderes hartes Material

The tubular drill carrying diamond particles at its lower edge is provided with longitudinal slots and has a conical upper part engaged by a corresponding cone on a ring nut so that by turning the nut the diameter of the drill may be adjusted to fine limits. Two concentric tubular drills may be arranged one within the other with inner and outer conical surfaces for independent adjustment. (3 claims, 1 illustr). Ref cited: 1 GP; 1 FP; 1 USP.

J *Ba Cfb Plz.545/Bm Cfb Plz.545*

GEM POLISHING

Jade-working technique in China. Die Technik der Jade-Bearbeitung in China

W. Fischer. *Dtsch Goldschmiede Ztg* 1961 Vol 59 (2) pp 69-72 (Feb) (In German)

A fully illustrated review of ancient techniques and the primitive methods still used. The use of diamond is explained. 15 illustr. *A* *Bcf Ceq N*

ROCK DRILLING

What's new in the drilling industry

J. F. Earl. *World Oil* 1961 Vol 152 (3) pp 63-68 (Feb 15)

Includes a section on bit-weights and speeds and gives conclusions of new studies. 11 illustr, 11 ref, 1 table.

E *Cfb.25*

The deflection of inclined bore-holes drilled with diamond. La déviation des forges inclinés exécutés au diamant

V. E. Kopylov. *Prospection et protection du sous-sol* 1960 (6) pp 44-46 (June) (Original in Russian, transl in French)

A study of this deflection and the factors governing it. 2 illustr, 1 table. *A* *Az Cfb Nh.21*

Quebec's new metal belt

C. H. Taylor. *Min J* 1961 Vol 256 (6549) p 207 (Feb 24)

Two diamond drilling rigs are testing, in parts, a three mile length of ground where five anomalous conditions were indicated in an electromagnetic survey.

E *Cfb Nh.12*

USSR : drilling deeper for oil

Anon. *New Scientist* 1961 Vol 9 (221) p 336 (Feb 9)

Soviet designers are working on equipment for drilling oil wells to a depth of 6 miles or more. In place of the conventional drilling bit, the possibility of using thermal shocks, hydraulic blows, and supersonic vibrations are being considered to clear the rock. Experience gained from these experiments will be of use to projects to drill through the Earth's crust.

E *Bnt Cfb/Cfb Pr.132*

LITERATURE REQUESTS

When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

High flux magnets assist borehole drilling

Anon. *Min J* 1961 Vol 256 (6543) p 43 (Jan 13)

A range of fishing tools using Mullard Ticonal G-magnetic material as the element are said to have overcome two main problems involved in the design of magnetic fishing tools. The range includes tools for routine use in diamond drill core barrels down to the smallest sizes. The importance of having a clean hole is probably greatest just before the securing of core by diamond drilling. Before the diamond drill crown is run down, a round trip with a magnetic tool ensures removal of all ferrous material from the bottom. In a second important application, magnetic elements are designed for insertion in the actual core barrel and travel up the inner barrel as coring proceeds, ferrous particles having been picked up when the empty barrel was first lowered at the beginning of the run. Other uses of high flux magnets are described. 3 illustr.

D *Cfb Nhc.1456*

BP 838,570 **Drilling & Service Inc** (Mar 8, 1957—conv date, USA)

Drill bits and drilling

The diamond studded body portion of the bit has three flattened facets symmetrically spaced around the periphery. Thus three vertical channels are provided through which detritus is readily washed upwardly. A central conical hole in the bottom of the bit also diamond studded aids the centering of the bit. The coolant is directed from the axial opening to a point approximately mediate the annular convex drilling face from which lateral channels branch off. The coolant has sufficient pressure to loosen the cut particles and take them into the up-stream of the fluid. (25 claims, 9 illustr). *J* *Bn Cfbr Nh.545*

BP 840,517 (Oct 22, 1957) **J. W. S. M. Greaves, G. W. Marshall, Halifax Tool Co Ltd**

Apparatus for grinding or sharpening rock drills, bits or like tools

The apparatus permits accurate positioning and indexing of a percussive rock drill bit *eg* a cross-bit for grinding correct cutting angles and relief angles. A single bit-holding means may be used angularly adjustable about a single axis for grinding one set of lateral surfaces and then the opposite set of lateral surfaces, or two independent bit-holding means may be employed. An additional bit holder may support the bit for peripheral grinding of the bit. The grinding wheel is adjusted towards the bit by a screw device and a diamond truing tool is mounted at the rear of the wheel. (28 claims, 18 illustr).

J *Al Chc Pr.545*

WIRE DRAWING

Diamond die polishing machine

S.A. Belgian Tool Co Ltd, 55 Rue Leopold, Malines, Belgium; Brit Rep : A. Tarr (Wire & Bedding Machines) Ltd, 939a Brighton Rd, Purley, Surrey. *Wire Industry* 1961 Vol 28 (326) p 159 (Feb)

The Bayaard twin-head diamond die polishing machine is said to require no attention at all while running. The Bayaard Complex unit comprises a number of such machines for re-polishing, sizing, and glazing and of horizontal machines for re-profiling and re-opening front and rear angles as well as for the re-cutting of heavily damaged dies. The range is said to save 50% in diamond dust and to offer savings in labour costs since as many as twelve twin-heads can be run by one semi-skilled operator. 1 illustr.

D *Nk:Hp Pr*

Mechanical descaling of steel wire rod in France
A. Liné, J. Peignier. *Wire & Wire Prod* 1961 Vol 36 (2) pp 181-190, 238 (Feb)

Includes factors affecting die wear and the laws governing good lubrication in wire drawing. 14 illustr.
E *An Cn Qr/Px Unr*

GRINDING AND POLISHING OF CARBIDES AND METALS

How Bob Clark increased diamond wheel life from 55 to 66 days at Cummins Engine Company, Inc
Bay State Abrasive Products Co, Westboro, Mass. *Grinding & Finishing* 1961 Vol 7 (1) pp 10-11 (Jan) (Advert)

Analysis of diamond grinding operations resulted in increased efficiency and reduced costs. Changing from ¼ to 1/16 in. diamond depth on certain jobs resulted in a saving of $13,000 a year, and a quantity ordering system saved a further $1,824.00 annually.
W *Chc Nv Uqe*

Crowned abrasive bands grind contours without edge cutting
Behr-Manning Co, Troy, NY. *Amer Mach* 1961 Vol 105 (3) p 126 (Feb 6)

Coated abrasive bands and belt, suited for both stock removal and polishing, assume any desired degree of crown, it is claimed, when run on inflatable rubber drums. 1 illustr. *E* *Pee Rdg*

Surface grinder holds five tons
Blanchard Machine Co, 64 State St, Cambridge 39, Mass. *Tool & Mfg Engr* 1961 Vol 46 (2) p 156 (Feb); *Grinding & Finishing* 1961 Vol 7 (2) p 51 (Feb)

The No 48-96 vertical spindle surface grinder has a 96 in. diameter full magnetic chuck, and will grind to the centre of work as large as 108 in. in diameter. The grinder is regularly supplied with a 100 hp spindle motor, but it is also available with motors up to 150 hp. 1 illustr. *L* *Chcm Pr*

Grinding wheels with coolant channels. Schleifscheiben mit Kühlkanälen
R. Buchner KG, Marktredwitz/Bayern. *Industriekurier* 1961 Vol 14 (25) p 82 (Feb 15) (In German)

Coolant-carrying channels radiate from the centre of the wheel, in a staggered arrangement in larger wheels, and are suitable for the usual kinds of wheel or for grinding segments. They are claimed to reduce wheel wear. *A* *Pe Psc Sj*

Simultaneous grinding
Diskus Werke AG, Frankfurt a.M., Brit Rep: Rockwell Machine Tool Co Ltd, Edgware Rd, London NW 2. *Mech World* 1961 Vol 141 (3500) pp 106-108 (Mar)

The DDS 1000 machine has two vertically opposed grinding spindles mounting 40 in. diameter wheels, a construction that enables boiler members to be ground to size without the use of fixtures. Components up to 60 × 27½ in can be ground. The grinding wheels are dressed by a special diamond dresser which is fed between the grinding wheels in a similar manner to the workpieces and then reciprocated longitudinally by the power driven rollers. For larger boiler members up to 71 × 39 in. the model DWH 1600/2000 is available. 4 illustr. *E* *Chc Pr Psf:Nj*

Ex-Cell-O Type 39-A precision internal thread grinding machine
Ex-Cell-O Corp, Detroit, Mich.; Brit rep: Ex-Cell-O Corp (Machine Tools) Ltd, Hastings Rd, Leicester. *Machinery, Lond* 1961 Vol 98 (2518) p 375 (Feb 15)

The No 39-A precision internal thread grinder is suitable for work of a wide diameter range. A wide variety of right- and left-hand threads, with single or multiple starts, can be ground. After setting the wheel position, the grinding operation is automatic. 1 illustr.
E *Chcpz Prs*

Transistors give automatic plunge, internal grind control
Federal Products Corp, 11060 Eddy St, Providence 1, RI. *Grinding & Finishing* 1960 Vol 6 (12) p 58 (Dec); *Tool & Mfg Eng* 1961 Vol 46 (2) p 156 (Feb)

Transistorized dimensional control units are now available for use with various types of gauge tooling to provide automatic control of plunge cut and internal grinding operations. Four basic models are said to cover single- or double-limit control of id or od grinders. 1 illustr.
D *Chcd Wp/Chcn Wp*

Weight-buffing : a precision operation
Fisher Scientific Co. *Grinding & Finishing* 1961 Vol 7 (2) pp 34-35 (Feb)

Describes the operation of the Parker Machine Co's special automatic buffing machine. 4 illustr.
E *Chmz Prs*

Automatic control of the diameter of pins being ground
A. B. Frenkel'. *Instrum Constr* 1960 (3) p 23 (Mar); *Instrum Abstr* 1961 Vol 16 (2) p 114 (Feb)

Details are given of a control mechanism for a centreless grinder. *D* *Chcc Pr Wp.133*

Hurth type SRS 400 grinder for gear shaving cutters
Carl Hurth, Germany; Brit rep: Vaughan Associates Ltd, 4 Queen Street, Curzon Street, London W 1. *Machinery, Lond* 1961 Vol 98 (2518) pp 375-376 (Feb 15)

For grinding involute tooth profiles on gear shaving cutters, this machine has a grinding wheel of 30 in. maximum diameter. A wheel dressing attachment is mounted on the guard, and different traversing speeds for the diamond slide, as required for taking roughing and finishing cuts on the wheel, are provided. A flat face is normally dressed on the wheel under the control of a straight edge, but profile shapes can be produced with the aid of templates when teeth of modified shape are to be ground. 1 illustr.
E *Alz Chch Pr Psf:Nj*

[Coolant dispenser]
E. I. A. Ilford display; Brit rep: North London Metals Ltd, 218 Mare St, London EC 8. *Machinery, Lond* 1961 Vol 98 (2520) pp 509-510 (Mar 1)

The French-made Synchrolub coolant dispenser was shown mounted on a grinding machine fitted with a diamond impregnated wheel for sharpening tungsten carbide tipped saws. The coolant is delivered directly and the point of cutting in a mist form and in sufficient quantity to prevent any metal becoming lodged in the diamond particles and to prevent overheating. 1 illustr.
E *Alf Bkcb Chc Nv Pr Psz*

Why surface grinding is replacing cutter-type machining
A. M. Mattison. *Grinding & Finishing* 1961 Vol 7 (2) pp 24-27 (Feb)

Lower costs, faster and simpler operation, and greater accuracy of parts are some of the advantages claimed for surface grinding. This has been made possible by improvements in grinders and abrasive wheels. 4 illustr.
E *Chcm.21*

Automatic cutter grinding . . . on the Jones & Shipman 540

A. A. Jones & Shipman Ltd, Leicester. *Metalworking Prod* 1961 Vol 105 (10) pp 64-65 (Mar 8)

Modifications to a standard Jones & Shipman model 540 surface grinder enable it to be used as a fully automatic cutter grinder in conjunction with an indexing head attachment now available. 3 illustr.

See also *Industr Diam Abstr* 1960 Vol 17 p A96 (Apr).

E *Alc Chc Prs*

The American Machine Tool Exhibition in Chicago 1960: Grinding machines. Die amerikanische Werkzeugmaschinen-Ausstellung in Chicago 1960 : Schleifmaschinen

M. Kronenberg. *Werkstatt & Betrieb* 1961 Vol 94 (2) pp 70-78 (Feb) (In German)

A number of machines are reviewed. Of particular interest are the Heald Centrimatic Model 090, in which the exact position of the diamond to the grinding wheel is maintained automatically, the Thompson numerically controlled surface grinder, in which the truing diamond is controlled hydraulically, and the Redin machine for deburring wheel teeth. This has a vertical spindle, driven by compressed air, and the grinding wheel glides across the teeth, guided and also trued by them. The Ex-Cell-O Corp electrolytic grinder is intended for grinding sintered carbide tools; it has a diamond grinding wheel on one side of the spindle, and on the other a narrow wheel especially for chipbreakers. The electrolytic grinding method used in this machine ensures considerable saving of diamond wheels. The Norton truing device, also reviewed here, operates automatically once it has been started. 32 illustr.

A *Chc Pr Psf:Nj.27/Chcr Nv Pr Psf.27*

Drill sharpener grinds any point

Leland-Gifford Co, Worcester 1, Mass. *Tool & Mfg Engr* 1961 Vol 46 (2) p 159 (Feb)

The Drill Point Master can produce and reproduce any desired point on any drill from No 80 to 0.250 in. in diameter. The grinder features independent adjustment of point angle, lip length and relief angle. There is a sandwhich wheel for clean, dry grinding and point thinning without burning. 1 illustr.

L *Alb Chc Pr*

Cam-operated driver saves time in center grinding

M. W. Loftus. *Grinding & Finishing* 1961 Vol 7 (2) p 15 (Feb)

1 illustr. *E* *Chc Pr Psz*

Drill point grinder

Machine Shop Equipment Ltd, Spenser Street, London SW 1. *Mach Lloyd* 1961 Vol 33 (4A) p 47 (Feb 25)

The machine has been developed for grinding drills with a concentric cutting point having equal cutting angles. It can be set for any drill size, and tolerances within 0.0005 in. are maintained. Right-hand or left-hand drills can be ground without additional attachments. There is a built-in diamond for wheel dressing. 1 illustr. *L* *Alb Chc Pr Psf:Nj*

Automatic abrasive cut-off halves screw machine costs

R. L. McKee. *Grinding & Finishing* 1961 Vol 7 (2) pp 11-12 (Feb)

The most drastic reductions reported were the changes in cost of cutting off and the elimination of end grinding. Abrasive wheels provide a ground end accurate to ± 0.0015 inch. Grinding wheels are $18 \times 0.050 \times \frac{1}{4}$ in. aluminium oxide, 80 grit, P grade. 2 illustr.

E *Cegc Pe Rj*

Wet-belt grinding combines accuracy, speed

O. Mark de Michele. *Tool & Mfg Engr* 1961 Vol 46 (2) pp 111-112 (Feb)

Grinding metal from a steel tube at a rate of almost 2 lb/min generates enough heat to stress and expand a workpiece unless the heat is removed. The large area of a belt offers an ample surface for heat transfer; floods of coolant carry it away. Result is that heavy removal rates can be maintained without loss of accuracy. 2 illustr.

L *Agm Bfd Chc Pee Qs Sj*

New Swiss machine tools. Neue schweizerische Werkzeugmaschinen

E. Mettler. *Maschinenwelt u Elektrotechnik* 1961 Vol 16 (2) pp 62-71 (Feb) (In German)

The article reviews a number of machines of various types, including a few of the latest drilling, grinding, and honing machines. 26 illustr.

A *Pr*

The MS-19 special purpose surface grinding machine

L. S. Lakher. *Biul tekh ekon inform* 1960 (9) pp 33-34; *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3187 (Jan) (Original in Russian)

E *Chcm Pr*

Reconditioning ball mill journals by honing

Nicol & Andrew Ltd, 20 Kelvin Ave, Hillington, Glasgow SW 2. *Machinery, Lond* 1961 Vol 98 (2521) p 537 (Mar 8)

The Master-Hone, which consists of a split pulley and frame carrying sets of grinding stones, is described regrinding the 33 in. diameter journals of a 10 ton ball mill. Adjustment is provided for closing the stones and the head is reciprocated over the work by a reactor attachment. 1 illustr. *E* *Az Chh Pr*

Numerical control comes to cylindrical grinding

M. M. Patterson. *Grinding & Finishing* 1961 Vol 7 (2) p 33 (Feb)

The application of numerical control to the Cincinnati 18 × 72 in. machine, using a cramatic numerical control system, is reviewed. 2 illustr.

E *Chcl Pr Wpz*

The production of F.H.P. electric motors

S. C. Poulsen. *Machinery, Lond* 1961 Vol 98 (2518) pp 348-358 (Feb 15)

Among operations described is the simultaneous grinding of seven shaft diameters at a set-up on a Scrivener 2G centreless machine. Also described is use of a Lidköking No 4 BU centreless machine, adapted for plunge grinding for work on rotor-shafts. Five surfaces are ground at once and bearing diameters are maintained within ± 0.00015 in. with a surface finish of 20 micro-in. r.m.s., while remaining diameters are kept within ± 0.00025 inch. The hydraulic dressing attachment is controlled by a profile bar and uses Van Moppes first quality industrial diamonds. With the Swedish control wheels, 6,000 to 8,000 components/dressing are said to be obtained. 14 illustr.

D *Chcc Pr Psfb:Nj*

Preparing samples for microscopic examination

A. Rakestraw. *Grinding & Finishing* 1961 Vol 7 (2) p 17 (Feb)

For grinding and finishing ductile iron samples, rough grinding with silicon carbide, rough polishing with cloth using diamond abrasive in paste suspension and final polishing on cloth using very fine alumina is recommended.

E *Bfc Chc/Bfc Chm Km*

Philips universal coolant clarifier for small grinders

Brit rep: Alfred Herbert Ltd, PO Box 30, Edgwick Works, Coventry; Research & Control Instruments Ltd, Instrument House, 207 Kings Cross Rd, London WC 1. *Machinery, Lond* 1961 Vol 98 (2518) p 374 (Feb 15)

The Philips type 7733/24 universal coolant clarifier of 200 gal/h capacity is primarily for use with small surface grinders. 1 illustr.

D *Chcm Pr Psc Qeb Sj*

Hartex centreless grinding machine

Brit rep: Rockwell Machine Tool Co Ltd, Edgware Rd, London NW 2. *Mach Shop Mag* 1961 Vol 22 (3) pp 173-174 (Mar)

The Hartex BED 5 centreless grinding machine can accommodate workpieces from 5/32 to 4¼ in. and is suitable for plunge grinding up to 10 in. long and also for through grinding. Grinding wheels up to 20 in. diameter and 10 in. wide can be fitted. 1 illustr.

E *Chcc Pr/Chcd Pr*

Semi automatic grinder for sawing disks. Sägeblatt-Schleifautomat mit Teilgetriebe

Aug Heinr Schmidt, Maschinenfabrik, Stuttgart-Feuerbach. *Werkstattstechnik* 1961 Vol 51 (2) p 89 (Feb) (In German)

On this machine it is possible to grind circular sawing disks of high speed steel and sintered carbide. For this a diamond grinding wheel is used and grinding is done wet. 1 illustr. *A* *Alfz Chc Nv Prsb*

Polishing carbide dies with diamond belts

J. Stangeby. *Tool & Mfg Engr* 1961 Vol 46 (2) pp 85-87 (Feb)

Refinishing round-core carbide drawing and extrusion dies is usually performed by manual operations with steel lapping tools or wooden dowels. Recently developed machines with diamond abrasive belts are claimed to be very much faster and more accurate and produce finer finishes, if used by skilled operators. Grit lines are produced in the direction of the draw, which extends die life considerably. Four major types of work involved in die maintenance are discussed. If a die needs to be opened up to the next larger size, diamond chip boring should be used, followed by diamond belt polishing. The machine used is described. The diamond particles are embedded and sealed into the nylon backing of the belts. Grit specifications are given. 4 illustr. *L* *Ax Bk Chm Nvg*

Vibratory finishing machine designed for laboratory use

Stevenson Co, Wellsville, Ohio. *Amer Mach* 1961 Vol 105 (3) p 134 (Feb 6)

Portable Vibrodyne Model V-013 is particularly adapted for deburring, radii-forming, descaling, cleaning, and polishing of small parts, powder metal gears, steel bushings, aluminium and copper parts for the electronic industry, ceramic eyelets, disks, and wedges. 1 illustr. *E* *Chm Pr Qn*

Turning, straightening and polishing machine

Straus-Artys Corp, 45 N Station Plaza, Great Neck, NY. *Tool & Mfg Engr* 1961 Vol 46 (2) p 172 (Feb)

This centreless bar turning, straightening and polishing machine is made in several sizes. Completely automatic operation is possible. The bar is first peeled and then transported into the straightening and polishing machine by means of an automatic leading and discharging device. 1 illustr. *L* *Ceqb Prs/Chm Prs*

LITERATURE REQUESTS
When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

Attachment for surface grinders permits varied operations

Therien Engng & Machine Co, 4908 N Odell Ave, Chicago 31, Ill. *Amer Mach* 1961 Vol 105 (3) p 132 (Feb 6)

Grinding disk cutters, points on lathe centres, mill saws, flats on a 30° 3-square triangular punch, are amongst the operations, it is claimed, this attachment makes possible. 1 illustr.

E *Chcm Pr Psc*

'Thompson' grinding machines: "Plunge-matic" and electrolytic models. Machines à rectifier 'Thompson' modèles Plunge-Matic et electrolytic

Thompson Grinder Co. *Mach Mod* 1961 Vol 55 (623) p 79 (Feb) (In French)

4 illustr. *A* *Chcd Pr/Chcr Pr*

Expand diamond grinding pin o.d. range to .2 — .5"

Titan Tool Supply Co Inc, Buffalo 16, NY. *Grinding & Finishing* 1960 Vol 6 (12) p 61 (Dec)

The Titan range of diamond grinding pins has been expanded to include 25 different sizes in a range from 0.2 to 0.5 in. diameter, all available in two grit sizes. Cylindrical shapes are among those supplied. 1 illustr.

D *Nvs*

Vaughan tap grinding machine

Vaughan Associates Ltd, 4 Queen Street, Curzon Street, London W 1. *Mach Shop Mag* 1961 Vol 22 (3) pp 176-177 (Mar); *Machinery* 1961 Vol 98 (2520) pp 496-497 (March 1)

Developed for grinding the chamfer or taper lead on taps up to 3 in. diameter, this tap grinder uses a 6 in. diameter cup-type grinding wheel. Straight line diamond dressing, operated by rack and pinion, is a built-in feature. 1 illustr.

E *Az Chc Pr Psf:Nj*

A versatile machine tool designed for the VC 10

Vickers-Armstrong Ltd; Coventry Tool & Gauge Co Ltd. *New Scientist* 1961 Vol 9 (222) p 405 (Feb 16)

A machine tool, described as a variable angle contour milling machine, was specially designed to be capable of following a pattern and working to high accuracy on large components. Operation is explained briefly. 1 illustr. *D* *Cfjz Pr*

Cut off grinding wheel. Trennschleifscheibe

Anon. *Industr Anzeig* 1961 Vol 83 (18) p 61 (Mar 3) (In German)

A new preparation gives added hardness to the front face of the wheel, prevents overheating, and also acts as a lubricant. The performance of the wheel remains satisfactory for any kind of material, but the wheel can be reinforced if particularly high demands are to be made. Steel up to 150 mm diameter can be cut dry without damaging the cutting edges of the wheel.

A *Bfd Cegc Pe*

Form fixture grinds cams; then grinds production parts

Anon. *Canad Mach* 1960 Vol 71 (12) p 296 (Dec)

A money saving method has been found for producing cams on the R-O universal form relieving fixture that, in turn, can be used on the fixture to cam grind production parts. 2 illustr.

D *Az Chc Psc*

Hints on turning beryllium

Anon. *Metalworking Prod* 1961 Vol 105 (8) p 56 (Feb 22)

Tool edges should be sharpened on 320-grit silicon carbide wheels, or on 200 to 300 grit diamond wheels and hand stoned after sharpening. Tool design is also dealt with. *E* *Al Chc Nv/Bfu Ceqb*

How to finish flame-plated coatings

M. A. Teter. *Grinding & Finishing* 1961 Vol 7 (1) pp 40-42 (Jan)

The two principal methods of finishing flame-plated coatings are: (*i*) precision diamond grinding or diamond grinding and lapping; and (*ii*) off-hand polishing with silicon carbide or diamond abrasives.

A resin-bonded, 100 concentrate diamond wheel, of 'L' or 'N' bond hardness, 100 to 400 mesh, is recommended. A water plus rust inhibitor oil flood coolant should be used. Infeeds per pass of 0.0001 to 0.005 in., for wheels of 400 to 100 mesh respectively, should not be exceeded. Cross feeds should be from 0.040 to 0.080 in./pass for surface grinding, and from 0.040 to 0.080 in./workpiece revolution for cylindrical grinding. Peripheral wheel speeds from 5,000 to 6,500 surface ft/min are acceptable, and should take into consideration the bond hardness. Diamond wheels should be balanced and trued on their individual wheel mounts for a total maximum amount of 0.0003 inch. Silicon carbide dressing is recommended; truing should not be necessary. Lapping requires pressures of 15 lb/sq in. and up, and a very thin vehicle. A table shows diamond particle sizes, with mesh size equivalents, together with the approximate r.m.s. finish to be expected. Non-precision finishing for reducing as-coated surface of 125-150 r.m.s. to 50-75 micro-in. r.m.s., can be carried out with silicon carbide or diamond. 5 illustr.

W *Chcw Nv/Chd Nv/Chm Kmg*

The production of steel cylinders of a high degree of surface finish and precision of form. Die Herstellung von Stahlzylindern hoher Oberflächengüte und Formgenauigkeit

H. v. Weingraber. *Werkstattstechnik* 1961 Vol 51 (1) pp 8-12 (Jan) (In German)

A new finishing process is described which uses a short-stroke cylindrical lap and makes extensive use of diamond. It is claimed to give a very high finish. 10 illustr, 3 ref, 1 table. *A* *Ag Chm Nv*

Automatic internal lapping machine. Automatische Innenläppmaschine

Anon. *Maschinenmarkt* 1961 Vol 67 (18) p 42 (Mar 3) (In German)

This machine incorporates a number of improvements: automatic application of the lapping abrasive through a hollow sleeve; automatic spacing of the sleeves, whose measurements can be pre-determined; fixed lapping sleeve and rotating workpiece. It is intended for lapping cylindrical drill holes, but the workpiece can be any shape, although it may not exceed a certain size. 1 illustr.

A *Chd Prs*

Titanium billets turned with increased know-how

Titanium Metals Corp of America, Ohio. *Machinery, NY* 1960 Vol 67 (4) pp 141-144 (Dec)

For optimum performance, carbide turning tools should be ground with a diamond wheel without further lapping. 4 illustr, 2 tables.

D *Al Bk Chc Nv Uqe*

[Universal grinding and polishing machine]

Anon. *Maschinenmarkt* 1961 Vol 67 (18) p 39 (Mar 3) (In German)

This machine has a revolving head with four different kinds of grinding wheel, each of which can be brought into use by revolving the head. Built as a portable table model, it replaces several machines with one. 1 illustr. *A* *Chc Pr/Chm Pr*

How to profit from major 1960 developments ?

Anon. *Grinding & Finishing* 1961 Vol 7 (1) pp 24-31 (Jan)

U.S. industry leaders were asked to answer three questions: (*i*) In what areas can abrasive users obtain greater economic advantages than they are at present realizing? (*ii*) What equipment will have the greatest effect on the grinding and finishing processes in the next five years? (*iii*) In what areas can the users obtain the greatest benefits from present day developments of grinding and finishing abrasives, equipment or processes?

W. H. Baudouine, of Elgin National Watch Abrasive Div, feels that diamond abrasive users would gain if they placed more responsibility with the manufacturer for research and application engineering of industrial diamond requirements.

H. H. Whitmore, Jones & Lamson Machine Co, believes that rotating sintered diamond particle (CDP) cutters have opened up a new and most efficient method of form control on grinding wheels.

W *Chc Kmg.132/Chm Kmg.132*

Reducing diamond wear

Anon. *Grinding & Finishing* 1961 Vol 7 (1) p 13 (Jan)

A reader inquires how to cut down on diamond wheel wear on carbides.

Suggested improvements to grinding technique include: (*i*) use of solid or spray coolant; (*ii*) use of largest suitable mesh size; (*iii*) use of harder grades; (*iv*) limiting of downfeed to 0.0005 in.; (*v*) frequent wheel dressing with pumice; (*vi*) greater attention to carbide tools in production and service.

W *Bk Chc Nv Unr*

Matrix-Thompson Plunge-Matic surface grinders

Coventry Gauge & Tool Co Ltd, Coventry. *Machinery, Lond* 1960 Vol 97 (2510) pp 1419-1420 (Dec 21)

The range is now available in more than twenty sizes with work tables from 8 × 24 in. up to 24 × 80 inches. Machines are intended for grinding flat surfaces on the work and for profile grinding by the infeed method on a fully automatic cycle. Diamond wheel dressers are provided. 1 illustr. *D* *Chcd Pr Psf:Nj*

Aluminium cylinder blocks revolutionize machining procedure

L. W. Collins jun. *Machinery, NY* 1960 Vol 67 (4) pp 111-118 (Dec)

Milling cutter bits are of hard grades of tungsten carbide; all surfaces that come in contact with aluminium chips are lapped with 500 mesh diamond to give a profilometer reading of 4 to 6 micro-inches. Extremely smooth surfaces are necessary to prevent welding of chips. 13 illustr.

D *Agz Bfg Cff Pdc/Az Bfg Chd Nv*

BP 840,678 **Bryant Chucking Grinder Co** (Apr 23, 1956—conv date, USA)

Machine tool control mechanism

This refers to a hydraulic mechanism for an internal grinder. Reciprocation of the tool is controlled by a fluid actuated servo-motor and a valve control lever system including four levers pivoted together in the form of a parallelogram. A work cycle may have the following phases: (1) Wheel remote from workpiece; (2) advance into grinding zone and rough grinding; (3) extended short withdrawal for truing by diamond; (4) return for finish grinding; (5) back to initial position. For such a cycle a programme cam is used with a division of its periphery into seven portions. (5 claims, 25 illustr). *J* *Pr Wp.545*

BP 840,647 **Ges. der Ludw. von Roll'schen Eisenwerke AG**
(Aug 2, 1957—conv date, Austria)

Grinding machines

The machine is a slideway grinder secured on the crossarm of a machine tool to be rotated horizontally

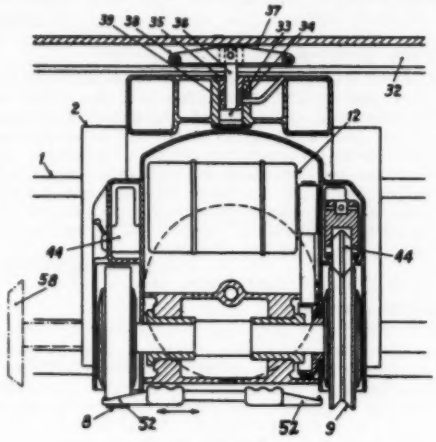


Fig 18. BP 840,647.

and adjusted vertically in perpendicular guides of a slide. Two grinding wheels are arranged on an axis spaced from each other together with a motor whose axis is parallel to the axis of the grinding wheels on a pivotal support mounted in a vertical slide. One of the wheels 9 can be shaped by a profiled crushing roller

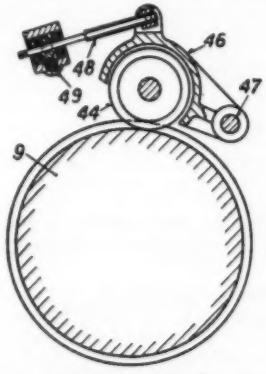


Fig 19. BP 840,647.

44 as shown in Fig 18, the other cylindrical wheel 8 to be trued by a diamond in holder 52 as shown in Fig 19 the holder carrying a second diamond for peripheral truing of the profiled wheel 9. A conventional hydraulic system is incorporated. (10 claims, 13 illustr).
J *Chc Pr Psf.545*

BP 842,170 **C. Klingspor**
(July 7, 1956 ; Jan 11, 1957—Conv date, Germany)

Rotary grinding units

Refers to a mounting structure with a helical or stepped annular rib *eg* a helically wound spring for a helically formed grinding body. (14 claims, 4 illustr).
J *Chcf Pr.545*

BP 844,143 (Nov 11, 1958) **M. J. Kent, Precision Grinding Ltd**

Means for trimming or analogous rotary bodies used in grinding or other machines

The support is to be attached to a machine tool and carries two main slides 6 and 11 at right angles to each other as shown in Fig 20 and 21. Between extensions 14 of slide 11 there is arranged a bracket 15 on a hollow

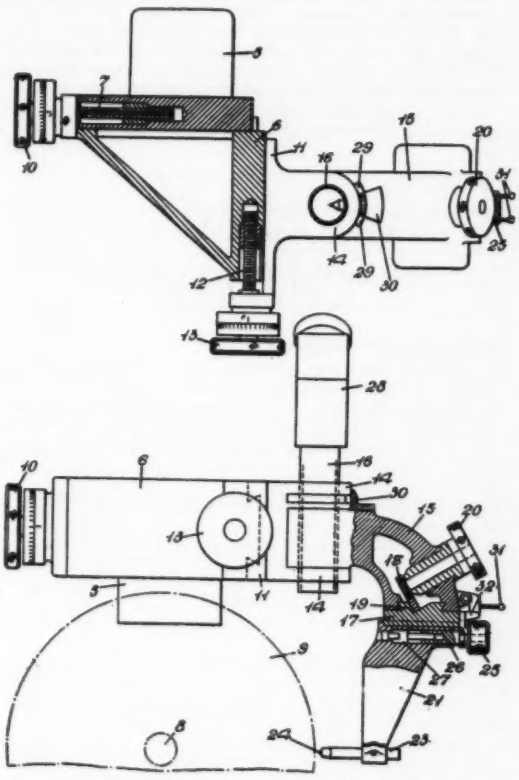


Fig 20 (below), 21 (above). BP 844,143.

pivot post 16. The bracket carries a third slide 17 movable by rack and pinion 19, 18. Sub-slide 21 moved by knob 25 carries diamond holder 23. A microscope is mounted on the hollow pivot post 16 so that the operator can watch the work. The eye piece contains a graticule shown in Fig with a concentric arrangement of segmental arcs for the various curvatures to be trued on the periphery of the wheel. (3 claims, 5 illustr).
J *Ab Cgz Pfz.545*

DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 55s, post free.

How to finish flame-plated coatings

M. A. Teter. *Grinding & Finishing* 1961 Vol 7 (1) pp 40-42 (Jan)

The two principal methods of finishing flame-plated coatings are: (*i*) precision diamond grinding or diamond grinding and lapping; and (*ii*) off-hand polishing with silicon carbide or diamond abrasives.

A resin-bonded, 100 concentrate diamond wheel, of 'L' or 'N' bond hardness, 100 to 400 mesh, is recommended. A water plus rust inhibitor oil flood coolant should be used. Infeeds per pass of 0.0001 to 0.005 in., for wheels of 400 to 100 mesh respectively, should not be exceeded. Cross feeds should be from 0.040 to 0.080 in./pass for surface grinding, and from 0.040 to 0.080 in./workpiece revolution for cylindrical grinding. Peripheral wheel speeds from 5,000 to 6,500 surface ft/min are acceptable, and should take into consideration the bond hardness. Diamond wheels should be balanced and trued on their individual wheel mounts for a total maximum amount of 0.0003 inch. Silicon carbide dressing is recommended; truing should not be necessary. Lapping requires pressures of 15 lb/sq in. and up, and a very thin vehicle. A table shows diamond particle sizes, with mesh size equivalents, together with the approximate r.m.s. finish to be expected. Non-precision finishing for reducing as-coated surface of 125-150 r.m.s. to 50-75 micro-in. r.m.s., can be carried out with silicon carbide or diamond. 5 illustr.

W *Chcw Nv/Chd Nv/Chm Kmg*

The production of steel cylinders of a high degree of surface finish and precision of form. Die Herstellung von Stahlzylindern hoher Oberflächengüte und Formgenauigkeit

H. v. Weingraber. *Werkstattstechnik* 1961 Vol 51 (1) pp 8-12 (Jan) (In German)

A new finishing process is described which uses a short-stroke cylindrical lap and makes extensive use of diamond. It is claimed to give a very high finish. 10 illustr, 3 ref, 1 table. *A* *Ag Chm Nv*

Automatic internal lapping machine. Automatische Innenläppmaschine

Anon. *Maschinenmarkt* 1961 Vol 67 (18) p 42 (Mar 3) (In German)

This machine incorporates a number of improvements: automatic application of the lapping abrasive through a hollow sleeve; automatic spacing of the sleeves, whose measurements can be pre-determined; fixed lapping sleeve and rotating workpiece. It is intended for lapping cylindrical drill holes, but the workpiece can be any shape, although it may not exceed a certain size. 1 illustr.

A *Chd Prs*

Titanium billets turned with increased know-how

Titanium Metals Corp of America, Ohio. *Machinery, NY* 1960 Vol 67 (4) pp 141-144 (Dec)

For optimum performance, carbide turning tools should be ground with a diamond wheel without further lapping. 4 illustr, 2 tables.

D *Al Bk Chc Nv Uqe*

[Universal grinding and polishing machine]

Anon. *Maschinenmarkt* 1961 Vol 67 (18) p 39 (Mar 3) (In German)

This machine has a revolving head with four different kinds of grinding wheel, each of which can be brought into use by revolving the head. Built as a portable table model, it replaces several machines with one. 1 illustr. *A* *Chc Pr/Chm Pr*

How to profit from major 1960 developments?

Anon. *Grinding & Finishing* 1961 Vol 7 (1) pp 24-31 (Jan)

U.S. industry leaders were asked to answer three questions: (*i*) In what areas can abrasive users obtain greater economic advantages than they are at present realizing? (*ii*) What equipment will have the greatest effect on the grinding and finishing processes in the next five years? (*iii*) In what areas can the users obtain the greatest benefits from present day developments of grinding and finishing abrasives, equipment or processes?

W. H. Baudouine, of Elgin National Watch Abrasive Div, feels that diamond abrasive users would gain if they placed more responsibility with the manufacturer for research and application engineering of industrial diamond requirements.

H. H. Whitmore, Jones & Lamson Machine Co, believes that rotating sintered diamond particle (CDP) cutters have opened up a new and most efficient method of form control on grinding wheels.

W *Chc Kmg.132/Chm Kmg.132*

Reducing diamond wear

Anon. *Grinding & Finishing* 1961 Vol 7 (1) p 13 (Jan)

A reader inquires how to cut down on diamond wheel wear on carbides.

Suggested improvements to grinding technique include: (*i*) use of solid or spray coolant; (*ii*) use of largest suitable mesh size; (*iii*) use of harder grades; (*iv*) limiting of downfeed to 0.0005 in.; (*v*) frequent wheel dressing with pumice; (*vi*) greater attention to carbide tools in production and service.

W *Bk Chc Nv Unr*

Matrix-Thompson Plunge-Matic surface grinders

Coventry Gauge & Tool Co Ltd, Coventry. *Machinery, Lond* 1960 Vol 97 (2510) pp 1419-1420 (Dec 21)

The range is now available in more than twenty sizes with work tables from 8 × 24 in. up to 24 × 80 inches. Machines are intended for grinding flat surfaces on the work and for profile grinding by the infeed method on a fully automatic cycle. Diamond wheel dressers are provided. 1 illustr. *D* *Chcd Pr Psf:Nj*

Aluminium cylinder blocks revolutionize machining procedure

L. W. Collins jun. *Machinery, NY* 1960 Vol 67 (4) pp 111-118 (Dec)

Milling cutter bits are of hard grades of tungsten carbide; all surfaces that come in contact with aluminium chips are lapped with 500 mesh diamond to give a profilometer reading of 4 to 6 micro-inches. Extremely smooth surfaces are necessary to prevent welding of chips. 13 illustr.

D *Agz Bfg Cff Pdc/Az Bfg Chd Nv*

BP 840,678 **Bryant Chucking Grinder Co**
(Apr 23, 1956—conv date, USA)

Machine tool control mechanism

This refers to a hydraulic mechanism for an internal grinder. Reciprocation of the tool is controlled by a fluid actuated servo-motor and a valve control lever system including four levers pivoted together in the form of a parallelogram. A work cycle may have the following phases: (1) Wheel remote from workpiece; (2) advance into grinding zone and rough grinding; (3) extended short withdrawal for truing by diamond; (4) return for finish grinding; (5) back to initial position. For such a cycle a programme cam is used with a division of its periphery into seven portions. (5 claims, 25 illustr). *J* *Pr Wp.545*

BP 840,647 **Ges. der Ludw. von Roll'schen Eisenwerke AG**
(Aug 2, 1957—conv date, Austria)

Grinding machines

The machine is a slideway grinder secured on the crossarm of a machine tool to be rotated horizontally

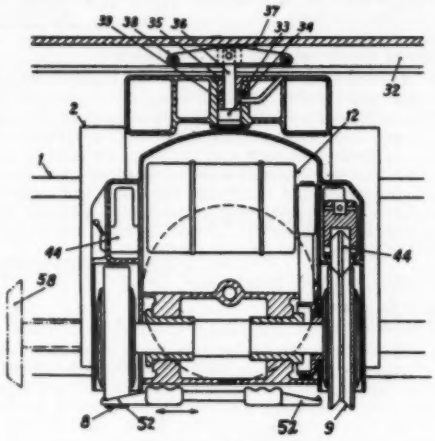


Fig 18. BP 840,647.

and adjusted vertically in perpendicular guides of a slide. Two grinding wheels are arranged on an axis spaced from each other together with a motor whose axis is parallel to the axis of the grinding wheels on a pivotal support mounted in a vertical slide. One of the wheels 9 can be shaped by a profiled crushing roller

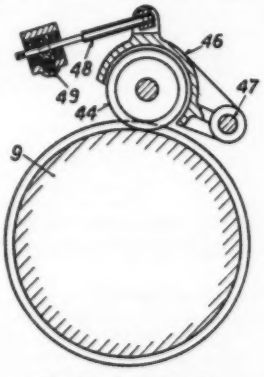


Fig 19. BP 840,647.

44 as shown in Fig 18, the other cylindrical wheel 8 to be trued by a diamond in holder 52 as shown in Fig 19 the holder carrying a second diamond for peripheral truing of the profiled wheel 9. A conventional hydraulic system is incorporated. (10 claims, 13 illustr).

J *Chc Pr Psf.545*

BP 842,170 **C. Klingspor**
(July 7, 1956 ; Jan 11, 1957—Conv date, Germany)

Rotary grinding units

Refers to a mounting structure with a helical or stepped annular rib *eg* a helically wound spring for a helically formed grinding body. (14 claims, 4 illustr).

J *Chcf Pr.545*

BP 844,143 (Nov 11, 1958) **M. J. Kent, Precision Grinding Ltd**

Means for trimming or analogous rotary bodies used in grinding or other machines

The support is to be attached to a machine tool and carries two main slides 6 and 11 at right angles to each other as shown in Fig 20 and 21. Between extensions 14 of slide 11 there is arranged a bracket 15 on a hollow

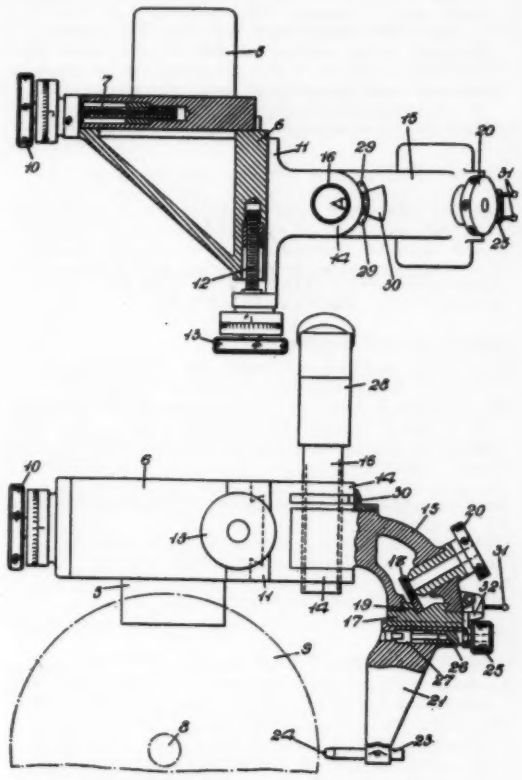


Fig 20 (below), 21 (above). BP 844,143.

pivot post 16. The bracket carries a third slide 17 movable by rack and pinion 19, 18. Sub-slide 21 moved by knob 25 carries diamond holder 23. A microscope is mounted on the hollow pivot post 16 so that the operator can watch the work. The eye piece contains a graticule shown in Fig with a concentric arrangement of segmental arcs for the various curvatures to be trued on the periphery of the wheel. (3 claims, 5 illustr).

J *Ab Cgz Pfz.545*

DIAMOND TECHNOLOGY

First published 1942 as " Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 55s, post free.

BP 844,034 **National Broach & Machine Co** (Mar 3, 1958—conv date, USA)

Grinder with compensating trimming mechanism

The grinder head is movable to position the grinder wheel either on-centre or off-centre with respect to a workpiece *eg* a gear wheel so as to perform an exceptionally efficient tooth grinding operation (off-centre grinding) or to shift the wheel to a centralized position for truing so that the truing device may be fixedly mounted. A mechanism including a compound screw shaft connects the movement of the table carrying the grinder head with the slide carrying the diamond truing device so that if the hand wheel imparting rotation to the compound screw feeds the grinding wheel by 0.0001 in. the truing device is moved by an equal amount to remove an amount of stock from the wheel equal to the feed. (10 claims, 4 illustr).
J *Chc Pr Psf.545*

MACHINING PROCESSES AND DEVELOPMENTS

Electrolytic drill sharpener

Connecticut Special Machine Inc, Winstead, Conn. *Cutting Tool & Engng* 1961 Vol 13 (2) p 32 (Feb)

The Ampak electrolytic drill sharpener for HSS twist drills is said to speed the sharpening rate 3 to 7 times but does not generate the heat of conventional grinding. 1 illustr. *E* *Albz Chcr Pr*

Anode processes occurring during the electropolishing of aluminium

N. P. Fedot'ev, S. IA. Grilikhes, N. L. Foroponova. *Zhur prikl khim* 1960 Vol 33 (9) pp 2079-2084 (Sep); *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (10) p 3161 (Jan) (Original in Russian)
E *Bfg Chmk*

Solar Weld Languepin spark erosion machines

La Soudure Electrique Languepin; Brit rep: Solar Weld Languepin Ltd, Fulledge Works, Burnley, Lancs. *Mach Shop Mag* 1961 Vol 22 (3) pp 172-173 (Mar)

The Seleromat A machine has a work table 20 by 25 in. and is capable of roughing metal removal rates of over 1000 cu mm/minute. The Seleromat B is also described. 2 illustr. *E* *Ceqmb Pr*

Electrochemical cutting comes to town

Anon. *Metalwg Prod* 1961 Vol 105 (3) pp 12-13 (Jan 18)

Briefly describes the process and assesses the importance of the latest developments in this field. 2 illustr.
D *Ceqmb.132*

Electro-erosion used for turning ops

Anon. *Metalworking Prod* 1961 Vol 105 (10) p 9 (Mar 8)

Electro-erosion machining techniques are being applied experimentally by Soviet engineers to the turning of cylindrical castings made from high alloy steels. Results it seems were not highly accurate.
E *Ag Bfd Ceqn.1456*

International Powder Metallurgy Conference

Anon. *J sci industr Res* 1960 Vol 19A (12) pp 595-596 (Dec)

Spark erosion sharpening of single point cutting tools made of sintered carbides is compared with sharpening with a diamond wheel.
E *Al Bkc Ceqmb*Al Bkc Chc Nv*

Electrolytic cutting . . . answer to super-alloys

Anon. *Metalworking Prod* 1961 Vol 105 (10) p 13 (Mar 8)

W. W. Gilbert of American GE considers that electro-chemical machining offers considerable promise to solve the problem of machining high temperature alloys. Rates of cutting have recently been increased by up to 10 times. *E* *Bfxz Ceqmb*

Machining hardened steel and the exotics

Anon. *Tool & Mfg Engr* 1961 Vol 46 (2) pp 88-89 (Feb)

Rough and precision machining of hardened steel, superalloys, and other exotics by electrical discharge, ultrasonic and electrolytic machining are dealt with. Each of these processes can perform operations which are said to be impossible by any other means. The three processes and machines for each are described. A relatively new electrolytic machining process which accomplishes trepanning, cut-off sawing and contour-forming is described too. 2 illustr.
L *Ceqh Pr/Ceqm Pr/Ceqr Pr*

Electrolytic machining

Anon. *Mech Engng, NY* 1961 Vol 83 (2) p 70 (Feb)

An electrolytic machining process is said to machine the toughest alloys in a tenth of the time taken by normal methods, and is said to be better than existing electrolytic machining processes, because the power is supplied by a simple rectifier. Metal is cut away by passing direct current between the workpieces, and the electrolyte. 1 illustr. *L* *Ceqh.1456*

Electrolytic machining

Anon. *Tooling* 1961 Vol 15 (3) p 35 (Mar)

Electrolytic machining is often suitable for machining difficult metals and components that are of a geometrical form that makes machining difficult, or that are too frail to withstand the forces encountered in conventional methods. It is stated that electrolytic machining enables hard workpieces to be machined with a good finish, without generation of heat and, without imposing strains upon them. Examples are given. *E* *Bf Ceqh*

PRODUCTION, GRADING & RECOVERY OF ABRASIVE PARTICLES

Economical diamond compound

Diamond Dust Co Inc, 77 Searing Ave, Mineola, L.I., NY. *Cutting Tool & Engng* 1961 Vol 13 (2) p 38 (Feb)

A diamond lapping compound which is reported 1.7 times as economical as diamond powder is made possible by developing a water dispersion vehicle which increases the adhesion of the compound to the workpiece. It is designed for lapping and polishing operations on carbide, sapphire, steel, and other hard materials, as well as for uses in precision grinding and plastic mould polishing. *E* *Chd Kmg*

Develop new abrasive for precision grinding

Norton Co. *Grinding & Finishing* 1961 Vol 7 (2) p 50 (Feb)

Reports field tests of 23 Alundum on a 42 in. Blanchard grinder. Segments are said to grind more pieces/dressing with less tendency to burn and give longer life than segments previously used in the same operations. 1 illustr. *E* *Chcw Pr Rj*

Abrasive disks

Norton Co. *Mech Engng, NY* 1961 Vol 83 (2) p 140 (Feb)

B 14 resinoid bond aluminium oxide or silicon carbide abrasive disks are uniform from front to back, from one disk to another in an order and from one order to the next. Two years of nationwide field tests were carried out and the disks were used to grind steels of all types and hardnesses, non-ferrous metals, ceramics, et cetera. The operations ranged from rough to precision grinding. The disks were found to cut faster and cooler and give more pieces per dressing than disks that were previously adopted as standards for the various operations. *L* *Pe*

TOOL PRODUCTION

Grinding angle for boring-bar bits

M. W. Loftus. *Amer Mach* 1960 Vol 104 (26) p 77 (Dec 26)

1 illustr. *D* *Albz Chc Uqcz*

Production of precision rollers

Murray's Pretoria Engineering Co Ltd, 26-28 Pretoria Rd, Romford, Essex. *Machinery, Lond* 1961 Vol 98 (2521) pp 539-540 (Mar 8)

The rollers, marketed under the trade name Murenco, are manufactured in batches on a production line. After being hardened to 63-65 Rockwell C, they are honed on a Raybrook horizontal machine to a diametral tolerance of 0.0003 inch. The external surfaces are ground on a Myford ML 12 machine. They are finished on a Brown & Sharpe surface girnder. After hardening, the mating pins are reduced to the required diameter by centreless grinding to a tolerance of 0.0003 inch. 3 illustr.

E *Agz Chc/Agz Chh*

Develop new resinoid bond for thick discs

Norton Co, Worcester 6, Mass. *Grinding & Finishing* 1960 Vol 6 (12) p 55 (Dec)

The B14 bond is said to make possible thick disks which are more uniform and faster cutting, and which give more pieces/dressing than disks previously regarded as standard. Comprehensive tests were made on all kinds of disk grinders and B14 disks are available in the wide range of shapes and sizes needed for operations on such grinders. Various types are mentioned here.

D *Pe Urb.132*

Sandvik factory for carbide turning tools

Sandvik Steel Works. *S Afr Min (Engng) J* 1961 Vol 72 Pt 1 (3550) p 374 (Feb 17)

The main product of the new factory will be the Coromant T-Max turning tool. The tool is provided with replaceable carbide inserts with up to eight cutting edges on each insert which can be used successively.

E *Ceqb Pdcb*

A cutter grinding problem solved at Caterpillar

M. M. Patterson. *Grinding & Finishing* 1961 Vol 7 (2) pp 28-29 (Feb)

Consisting of left and right hand sections, the cutter required grinding of straight and radius blades with negative and positive rake angles. An Oliver No 2 Arc Radius Grinder was used. To provide the production required two machines were recommended, one for the left-hand sections and the other for right-hand sections. A large micrometer was used to ensure that the diameter of the left and right sections should be equal. 4 illustr. *E* *Alc Chc Pr*

A Brazilian machine tool plant

P. A. Sidders. *Machinery, Lond* 1961 Vol 98 (2521) pp 524-533 (Mar 8)

Describes different machines used in the manufacturing process including a Newall cylindrical grinder and a Schaudt grinder. 9 illustr, 1 table.

E *Pr Qc.2635.346*

Milling cutters with quick setting blades

Anon. *Czech Heavy Industry* 1960 (10) pp 30-33; *Pera Bull* 1961 Vol 14 (1) p 11 (Jan)

Discusses carbide selection, setting-up of blades, and grinding of assembled cutters.

D *Alc Bk Chc*

Some examples of machining operations and tools employed on aluminium cylinder blocks

Anon. *Machinery, Lond* 1961 Vol 98 (2518) pp 369-374 (Feb 15)

The article describes various set-ups, including the special cutters for taking combination cuts on aluminium and cast iron. All tooth surfaces that contact aluminium chips are lapped with 500 mesh diamond abrasive to a profilometer reading of 4 to 6 micro-inches. Very smooth surfaces are necessary to prevent chips from welding to the teeth, only scratches extending across the face of a tooth being tolerated. 8 illustr.

D *Agz Bfg Ceq Pd/Al Chd Km*

BP 836,591 **Minnesota Mining & Mfg Co**

(May 2, 1955—conv date, USA)

Moulded abrasive wheels and methods of making them

A mixture of abrasive grains and a liquid resinous binder is uniformly distributed within a rapidly rotating centrifugal mould. The mixture is permanently hardened (by heat) while the grains are in dynamic equilibrium with the binder, *ie* so that increased centrifugal force does not cause any change in the position of the grains in the binder. The grains may be added slowly to the spinning mould and the binder (epoxide resin) may be added separately as a liquid or as a powder to be liquified in the mould. Reinforcing fibres may also be added. (10 claims, 4 illustr).

J *Pe Qc.545*

BP 838,300 **T. Horie**

(Oct 7, 1955—conv date, Japan)

Process for the manufacture of grinding materials

It has been discovered that when a bond material is mixed with a foamed mass of water which has been prepared by agitating water with a surface active agent added thereto a foamed mass is formed of which the bubbled state is the same as that of the foamed mass of water and if abrasive powder is incorporated into the mass of bond material by agitating the whole mass the powder is evenly distributed and retained among and between the bubbles. On hardening a grinding material of a spongy structure is obtained which can be fixed to paper, cloth, leather, *etc.* to be made into a spongy grinding belt. Diamond powder, silicon carbide, aluminium oxide or other such powders may be used as abrasive. (5 claims, no illustr).

J *Pe Qc Rd Ur.545*

BP 840,784 (Jan 8, 1958) **C. D. Monninger Ltd, A. Arthur**

Improvements in or relating to saw blades

(10 claims, 3 illustr).

X *Ba Ceg Pcc.545*

REQUESTS FROM AMERICA

American readers who wish to order a photostat or reprint of an article abstracted in Industrial Diamond Abstracts are advised to apply directly to the appropriate journal if this is an American publication.

BP 838,380 **Micromatic Hone Corp**
(Jan 31, 1957—conv date, USA)

Honing devices

The device employs high frequency oscillation to supplement honing with bonded honing stones. Honing stones become glazed if the (silicon carbide or fused alumina) grains in their vitrified bond are not subjected to sufficient tangential forces either to scratch the surface or to fracture the bond which re-sharpens the stone. A high ratio of grit to bond (90% to 10%) is employed to make the stones self-dressing and soft grades of bond are chosen which however reduce the life of the stone. High frequency oscillations not only prevent the glazing by constant self-dressing but reduce the amount of power and pressure required for the honing operation and hardest bonding materials may be used. (5 claims, 5 illustr).

J *Pgk.545*

BP 838,565 (Jan 29, 1958) **Rexall Drug Co**

Reinforced abrasive products

A fibrous reinforcing material is incorporated which ignites at the heat of grinding thus disintegrating at the grinding surface and leaving small recesses serving to introduce additional sharp cutting edges. The reinforcing material may be woven or non-woven or felted structure or composed of parallel and/or non-parallel strands on a suitable carrier or bonded together to form an open net-work. It may be metallic or non-metallic (fine steel wire, glass fibre, etc.) or a composite element of a high strength filamentary base and a readily oxidizable metal (finely divided magnesium metal as ignitable substance). (9 claims, 5 illustr).

J *Pe Unt.2595.545*

BP 840,571 **T. Sachs**
(Jan 16, 1957—conv date, Germany)

Process for the manufacture of grinding wheels, disks and the like

Thin layers of abrasive granules are coated with a synthetic resin and applied over the surface of a thin sheet *eg* tissue paper which is not impregnated. The granules are affixed to the sheet by a brief softening *eg* through a heat shock by infra-red radiation. A number of layers are formed into a stack, compressed and heated. Layers of resin-impregnated paper or fabric may be provided between the abrasive-coated layers. Solid or flexible disks may thus be made *eg* in open pressure moulds between two heated plates. A rough disk may have a diameter of 182 mm, a thickness of 6.2 mm and be stamped out to a diameter of 178 mm. with a central hole of 22 mm. (6 claims, no illustr).

J *Pe Qc.545*

BP 842,074 **C. Klingspor**
(Jan 15, 1958—conv date, Austria)

Rotary abrasive member

Abrasive members composed of abrasive flaps held in a carrying ring cannot be constructed in large widths *eg* exceeding 300 mm by arranging several flap carrying rings side by side because they produce grinding marks at the joints of the several rings. However if the flaps are arranged on a carrying ring with helical end surfaces to form a helical array the length of which is between the fraction of a full turn and several turns then no grinding marks will appear. A number of such rings may form an abrasive member of increased working width. (4 claims, 4 illustr).

J *Chcf Pe.545*

POWDER METALLURGY

Steel-bonded carbide dies save !

R. L. Post. *Amer Mach* 1961 Vol 105 (3) pp 84-85 (Feb 6)

Ferro-Tic C, a sintered composite of tool steel and titanium carbide, produced by powder metallurgy techniques, can, in the annealed state, be sawed, drilled, turned, milled, reamed, or threaded, then hardened to Rh C 73, it is claimed. After hardening, the carbide can be ground with silicon carbide wheels, or lapped with silicon carbide, boron carbide, or diamond compounds. Because of these characteristics, the Edwin L. Wiegand Co can now make its own tools and dies without expensive diamond wheels or special machines, it is reported. 3 illustr.

E *Ax Bkc Ceq/Ax Bkc Chd Kmg/Pxb Urc*

What vacuum metallurgy is doing in jet-age fields

A. E. Williams. *Canad Mach* 1960 Vol 71 (12) pp 136-137, 140, 142, 144, 396 (Dec)

Among developements discussed are improvements in components made by powder metallurgical methods due to the use of vacuum processes to extract gases from the sintered components. 11 illustr.

D *Qt.132*

MISCELLANEOUS

A history of the gear cutting machine : an historical study in geometry and machines

R. S. Woodbury. *The Prod Engr* 1960 Vol 39 (11) p 680 (Nov)

Book, Massachusetts Institute of Technology, Technology Press, Cambridge, Mass. 1958, 135 pp, illustr. (Technology Monographs, Historical Series, No 1). [Not in library of Industrial Diamond Information Bureau].

D *Ad Ceg Pr.28.52*

Reducing wear in lignite mining — an urgent task. Verschleissminderung im Braunkohlenbergbau—eine dringende Aufgabe

E. Schaffhirt. *Berbautechnik* 1961 Vol 11 (1) pp 6-7 (Jan) (In German)

The causes of wear are discussed, and measures suggested to reduce it. 22 illustr.

A *Cb Pr Unr*

Progress in the international standardization of tools. Fortschritte in der internationalen Werkzeugnormung

H. Nitsche. *Industr Anzeig* 1961 Vol 83 (18) pp 271-275 (Mar 3) (In German)

A general article in which the conditions that make standardization necessary are outlined, and the working of ISO explained. A number of tools for which recommendations have already been made are discussed. 8 tables.

A *Pr.255.311*

PUBLICATIONS RECEIVED

BOOK REVIEWS

Alluvial prospecting and mining

S. V. Griffith. Pergamon Press, Oxford, London, New York, Paris, 1960. 2nd rev ed, 245 pp, illustr, indices. Price £2 2s

In this second edition the chapter on alluvial diamond mining has been enlarged to cover Ghana, the Congo, Angola, and SW Africa. The characteristics peculiar to the diamondiferous gravel and techniques of mining it in each area being outlined. Chapters deal with prospecting methods, sampling and valuation, dry concentration of minerals, miscellaneous mining methods, and other related topics. Use of diamond drills in drilling of holes for forward preparation of overburden is considered. The book may be used as a students' textbook or by mining engineers. A bibliography covers the most important articles on alluvial mining published during the last thirty years.

D *Ebe Hd.52/Ebe.12.52*

Fundamental principles of powder metallurgy

W. D. Jones. Edward Arnold (Publishers) Ltd, London, 1960. 1032 pp, illustr, indices. Price £7 7s

This comprehensive textbook is intended to provide graduates with a full and broad account of the fundamentals of the subject. After considering the ways in which specific metallic structures can be manufactured from powders the author discussed some of the principles involved in choice and usage of certain structures from the viewpoint of how far properties of metallic materials produced by conventional techniques may be modified by powder metallurgy techniques, or how new materials may be made by these techniques. A section is devoted to diamond tools, which, in general, present few manufacturing difficulties. Factors needing attention include good distribution of diamonds in the matrix, use of high quality diamond and optimum concentration and size, complete absence of porosity, and correct choice of matrix. Hot-pressing or infiltration techniques are always recommended. The technique of forming matrices by powder metallurgy is traced from the earliest mention of the conception in 1883. Applications of diamond tools are outlined and considered in the light of : (*i*) rate of abrasion ; (*ii*) accuracy ; (*iii*) perfection of finish ; and (*iv*) cost of abrasion in terms of volume/carat of diamond used. The book is well-produced and illustrated and the indices include a useful patent list.

D *N Qc V wlb.52*

Outline of mineralogy and petrography. Grundriss der Mineralogie und Petrographie

H. Jung. VEB Gustav Fischer Verlag, Jena, 1960. 415 pp, illustr, indices, 3rd ed. (In German)

The book is divided into three main parts : General mineralogy, dealing with crystal morphology, physics and chemistry ; special mineralogy, forming the most comprehensive part of the book, in which minerals are studied in three main genetic groups ; and petrology, which discusses briefly magnetic, secondary, and metasomatic stones, metamorphite, meteorite and tectite. Diamond is considered in the second section, as one of the minerals of predominantly magnetic origin. Diamond and graphite, natural and synthetic diamonds are discussed, and some general information is given.

A *F V wd.52/Fh.52*

Precious stones and gems from the goldsmith's point of view. Edelsteine und Schmucksteine vom Goldschmied aus gesehen

T. Strauss. Rühle-Diebener Verlag KG, Stuttgart, Germany, 1960, 90 pp, indices. (In German)

Of interest both to the layman and to the specialist, and written from practical knowledge of this subject, this book sets out the main features of the most important stones and groups of stones. Valuable advice is given on the general care of stones. The section on diamond gives some basic facts on the nature of diamond, and details of the range of colour, faults, and weights. It is a common error that diamond is not affected by heat, but if precautions are taken it does resist heat better than any other stone.

A *Bb U.52/F U.52*

Observations on wear in sintered carbide tools. Beobachtungen über den Verschleiss an Hartmetallwerkzeugen

H. Opitz, G. Ostermann, M. Gappisch. Forschungsberichte des Wirtschafts und Verkehrsministeriums Nordrhein-Westfalen, Westdeutscher Verlag, Köln and Opladen, 1958, 38 pp, illustr. Mimeographed. (In German)

A detailed investigation into the cause of wear in sintered carbide tools. General wear phenomena, studies of wear surfaces and welding between sintered carbide and steel and cast iron respectively are discussed.

A *Pdc Unr.52*

TRADE LITERATURE

Bohle milling machines

Reinhard Bohle KG, Bielefeld, Joellenbeck, Germany. 8 pp, 8¼ × 11¾ in., illustr

Gives details of Bohle knee-type, production, programme, copying and bed-type milling machines, and reviews their special machine tools.

A *Cff Pr.57*

Rema grinding machines

Elektromaschinenfabrik REMA, Reichmann & Sohn, Weissenhorn/Bayern. 12 pp, 8¼ × 11¾ in., illustr. (In English)

Gives illustrations and details of the Rema range of electric grinders, electric grinders with coolant attachment, grinders with built-in exhaust systems, heavy duty snagging grinders, single-ended grinders, stone dressing machines, grinders with AT work rests, and combination grinding and polishing machines.

A *Chc Prd.57*

Loewe production milling machines types FW3/FW4

Ludw. Loewe & Co AG, Berlin NW 87. 12 pp, 8¼ × 11¾ in., illustr

The machines are illustrated and explained. They are claimed to be simple to operate, either automatically or manually, and to have wide ranges and fast speed and feed rates. Details of the special accessories available are given.

A *Cff Pr.57*

PATENT LISTS

BRITISH

The Official Journal (Patents) 1961 (3756) (Feb 8)

864,779 LANDIS TOOL CO. Grinding machines.

864,760 KLINGSPOR, C. Grinding wheel.

864,402 PHILIPS ELECTRICAL INDUSTRIES LTD. Methods of mounting diamonds.

The Official Journal (Patents) 1961 (3757) (Feb 15)

865,149 WLODEK, T. W. Apparatus and method for impact testing of materials.

865,132 ABRASIVE DEVELOPMENTS LTD. Grinding lens blanks.

The Official Journal (Patents) 1961 (3758) (Feb 22)

865,450 AMERICAL OPTICAL CO. Grinding and polishing machines.

UNITED STATES

Official Gazette 1961 Vol 762 (1-5) (Jan)

2,966,722 E. H. HULL, J. NERAD, GENERAL ELECTRIC CO. Irregular surface diamond burnishing tool.

2,966,767 J. H. KRESS, AMERICAN OPTICAL CO. Method of making multifocal lenses.

2,967,095 C. S. HERRICK, GENERAL ELECTRIC CO. Method and apparatus for forming single crystal in cylindrical form.

2,967,347 O. H. RHEA, GENERAL MOTORS CORP. Method of undercutting a commutator.

2,967,381 G. C. BROWN, BENDIX CORP. Means for cutting.

2,968,132 R. L. HAZELTON, OMNI AMERICAN ENGINEERING CO. Magnetostrictive grinding machine.

2,968,133 M. M. REICHARDT, GENERAL MOTORS CORP. Involute generating device and indexing mechanism therefor.

2,968,134 T. G. LEWIS, E. I. DU PONT DE NEMOURS & CO. Manufacture of precision cones.

2,968,135 S. A. BOETTCHER, J. C. PAGE, ABRADING SYSTEMS CO. Lapping machine.

2,968,136 G. D. BEHLEN, UNITED STATES ELECTRICAL TOOL CO. Grinding machine assemblies.

2,968,200 H. LATOUR, M. -L. KLEIN. Small-sized drill and method for producing same.

2,968,866 R. B. SOPER, J. J. DOHERTY, SYLVANIA ELECTRIC PRODUCTS INC. Method of producing thin wafers of semi-conductor material.

2,968,896 D. R. MacFARLANE, WESTERN ELECTRIC CO INC. Method and apparatus for grinding cams.

2,968,999 E. J. BRETON. Process for cutting metal employing amorphous silica.

2,969,053 R. R. WENTZEL, WENTZEL CARBIDE TOOL CO INC. Teeth for reciprocating stone cutting saw blade.

2,969,262 H. P. STANFORT. Bearing for high-speed spindles particularly for spinning and twisting machines.

2,969,620 O. BRETCHER, LUDW VON ROLL'SCHEN EISENWERKE AG. Slideway grinding machine.

2,969,621 D. S. CAMPBELL, SHEFFIELD CORP. Apparatus for grinding toothed members.

2,969,622 M. GOGOL. Means for reproduction of master shapes.

2,969,624 W. A. CASTINE jun, D. R. BUCKLES, J. R. DAHLBERG, PITTSBURGH PLATE GLASS CO. Edge seaming apparatus.

2,969,625 G. M. SNYDER, LANDIS TOOL CO. Control actuating means for machine element having a variable zone of movement.

2,969,669 I. S. HIRSCHORN, RONSON METALS CORP. Abrasion testing apparatus.

2,970,017 M. ZASLAWSKY, ISICO SA. Shock absorbing bearing for measuring instrument.

SOUTH AFRICAN

Official Journal 1961 Vol 14 (1-4) (Jan)

59/4738 L. A. HANSEN, R. E. PEMBRICK, J. W. SPRAGUE, NORTON CO. Coated abrasives.

AUSTRALIAN

Official Journal 1960 Vol 30 (46-48) (Dec)

231,338 D. G. MALPAS, D. P. MALPAS. Grinding hypodermic syringe needles.

SWISS

Patentliste 1960 (22-24) (Nov-Dec)

350,563 K. H. SCHULTZE, HERBERT LINDNER GmbH. Screw-thread producing machine provided with a lead screw.

350,564 W. SUHNER. Resin-bonded fibre-reinforced grinding wheel with mounting device.

350,734 C. BALLHAUSEN, T. KRALL, H. SCHIERHOLT, H. -J. SCHULZ, DEUTSCHE EDELSTAHLWERKE AG. Device for feeding current to the spark gap of spark erosion machines.

350,735 G. WANINGER, H. KURTH, AG FUR INDUSTRIELLE ELEKTRONIK AGIE. Device for mounting and driving the electrode of an electro-erosion machine tool.

351,047 W. ULLMANN, AG FUR INDUSTRIELLE ELEKTRONIK AGIE. Electrode vibrator for electro-erosion machine tools.

351,109 R. E. REASON, TAYLOR, TAYLOR & HOBSON LTD. Apparatus for measuring irregularities of the surface of a workpiece.

351,157 E. HILL. Cutting tool with a detachable and reversible tip.

351,210 J. V. SANTOCHI, PITTSBURGH PLATE GLASS CO. Apparatus for drilling a hole in a blade of glass.

FRENCH

Bulletin Officiel 1961 Vol 2 (1-5) (Jan-Feb)

1,249,945 HAMMOND MACHINERY BUILDERS INC. Grinding machine with oscillating head.

1,249,904 CO DE SAINT-GOBAIN. Glass polishing agents.

1,250,225 WICKMAN LTD. Apparatus for depositing or machining metal by electric sparks.

1,250,842 TAYLOR, TAYLOR & HOBSON, G. O. RAWSTRON, RANK PRECISION INDUSTRIES LTD. Polishing apparatus.

1,250,843 TAYLOR, TAYLOR & HOBSON, G. A. RAWSTRON, RANK PRECISION INDUSTRIES LTD. Method of polishing.

1,250,471 C. O. HUFFMAN, G. W. MISSON, W. F. GALEY, PITTSBURGH PLATE GLASS CO. Apparatus for cutting glass.

1,250,723 RIGAKU DENKI CO LTD. Method for measuring a crystal lattice by means of X-rays.

1,250,452 R. M. CURCIO, FIDELITONE INC. Method and device for fixing a diamond or another precious stone on a support.

1,251,779 G. E. MYERS, METAL CARBIDES CORP. Cutting knives for machines for cutting sheet metal bonds and their method of manufacture.

1,251,424 SOCIÉTÉ D'ETUDES D'OUTILLAGE DE PRÉCISION. Grinding machines.

1,251,757 LARING COES jun, CIE DES MEULES NORTON. Grinding wheel and grinding machine with a device for regulating the peripheral speed of the wheel as a function of its diametrical wear.

1,251,585 C. BALLHAUSEN, DEUTSCHE EDELSTAHLWERKE AG. Method and device for the production and utilisation of high pressures.

1,252,422 ELECTRICAL INDUSTRIES LTD, BRITISH THOMSON-HOUSTON CO LTD. Cutting tool.

1,252,479 J. DIONISOTTI. Rock drilling tool.

1,253,021 H. J. SCHULZ, H. WALTER, DEUTSCHE EDELSTAHLWERKE AG, ALLGEMEINE ELEKTRICITÄTSGESELLSCHAFT. Electrode for spark erosion and its method of manufacture.

74,646
1,165,986 ARMSTRONG SIDDELEY MOTORS LTD. Polishing machine.

1,253,117 MIDWEST SUPPLEY & MFG CO. Machine for finishing a plane material.

GERMAN

Applications Open to Public Inspection

1,097,720 W. SPÄTH. Method for determining the dynamic behaviour of a material and device for carying out the method.

1,097,788 J. J. SIGMAN jun, W. S. PRAEG, NATIONAL BROACH AND MACHINE CO. Honing tool for finishing gear wheels.

1,097,850 W. OSENBERG. Device for grinding cylindrical interior surfaces.

1,097,854 K. T. GRUBB, B. GRUBB, H. STRUERS CHEMISKE LABORATORIUM. Polishing cloth for the polishing of metal surfaces with loose diamond powder, in particular for metallographical purposes.

1,098,195 J. R. O'NEIL jun, H. W. BUELL, CARBORUNDUM CO. MSethod for grinding fabrics.

1,098,332 J. I. TAITO-KU. Grinding tool for machining gear wheels with lengthwise curved teeth having an involute profile.

1,098,395 SHEFFIELD CORP. Device for truing a ribbed grinding wheel.

1,098,397 H. SCHWABE, JENOPTIK JENA GmbH. Pneumatically measuring-controlled polishing machine.

1,098,427 E. M. TRENT, D. B. COMINS, HARD METAL TOOLS LTD. Method for making hard sintered materials on the basis of aluminium oxide.

1,098,719 R. E. REASON, TAYLOR & HOBSON LTD. Device for measuring or indicating the roughness or waviness of the surface of a workpiece.

1,098,788 GEBR HELLER, W. K. M. KLEINE. Drilling tool.

1,098,847 E. S. R. GAVAIS, BI-FLEX BIRKENSTOCK KG. Polishing wheel.

1,099,386 A. FUMIA, GLEASON WORKS. Grinding machine for truing the cutter head of a gear cutting machine.

1,099,433 NAXOS-UNION SCHLEIFMITTEL- UND SCHLEIFMASCHINENFABRIK. Device for impregnating porous ceramic grinding bodies with metal alloys difficult to dissolve.

1,099,890 P. DUMMEL. Grinding machine with freely oscillating tool holder.

1,099,891 W. GEHRING. Honing tool.

1,099,893 C. F. VOYTECH. Device for truing the lapping surface of lapping machines.

IDR REPRINT SERVICE

The following reprints are now available from Industrial Diamond Information Bureau, 2 Charterhouse Street, London EC 1, at a charge of 1s each, post free :

I 256—A film for recording the reactions in the diamond wheel structure, by K. E. Schwartz (*IDR* 1959).

I 257—The grinding technique and its importance for the proper use of carbides in the woodworking industry, by T. Englesson (*IDR* 1959).

I 258—Some growth characteristics of synthetic diamonds : a distinction between natural and synthetic diamond, by S. Tolansky and I. Sunagawa (*IDR* 1960).

I 259—Interferometric studies on synthetic diamonds, by S. Tolansky and I. Sunagawa (*IDR* 1960).

I 260—The use of a new kind of precision micro-sieve for grain-size analysis, by O. Lauer (*IDR* 1960).

I 261—Improvements in diamond drilling and sawing : the effects of soft soap as a wetting agent and softener, by G. B. Dauncey (*IDR* 1960).

GENERAL NOTES

The Industrial Diamond Information Bureau is included in the Diamond Research Organization of Industrial Distributors (Sales) Ltd (incorporated in the Union of South Africa), together with the Diamond Research Laboratory in Johannesburg.

Abstracts

The Bureau prepares abstracts of current scientific and technical literature, including patents, on industrial diamonds and associated subjects. These are published monthly in *Industrial Diamond Abstracts*, which is supplied free to those concerned with the use of diamonds for industrial purposes, and to specialist libraries. The publishers do not claim any copyright in respect of abstracts in this journal. No specific acknowledgement is made to other abstract journals, and no objection will be made to other abstract journals using the contents.

The list of journals (latest issue, September 1955) from which *Industrial Diamond Abstracts* is compiled will be supplied on request.

Library

The Bureau has a Reference Library which seeks to cover world literature on the application and production of diamond tools. It is kept up to date by a careful examination of new publications announced in abstract and technical journals, and covers, in addition to English, German, French and Russian books. The library specializes in technical and scientific pamphlets.

Patent Abstracts

Patent lists are prepared from official patent journals of the major industrial countries, and patent abstracts in general from the printed patent specifications. Printed copies of British patent specifications accepted may be obtained from the Patent Office, Southampton Buildings, London WC 2, at 3s 6d each. Numbers given under British applications for patents are for reference in all correspondence up to acceptance of the complete specification.

The following abbreviations are used :—BP for British Patent, USP for United States Patent, DAS for German Patent Application, DBP for German Patent (GP for German Patents issued prior to 1950), FP for French Patent, Canad P for Canadian Patent, and RP for Russian Patent.

Supply of Literature

1. **Loan Service :** much of the literature abstracted in this journal is available in its original form, and can be borrowed for a period of fourteen days (in Great Britain only). When applying for a loan, please quote the title of the article, the name of the author, and the number of the page on which it appeared. *Do not quote* the coding at the end of an abstract as this is for internal reference only.

2. **Reprints :** copies of certain selected articles on industrial applications of diamond are available and can be supplied on request at a charge of 1s each, post free. New reprints are announced from time to time in this journal, and a classified list of reprints, dated September 1958, is available free on request.

Technical Information

The Bureau offers the resources of its considerable literature holdings to those seeking specific information on diamond tool and similar applications. Problems requiring fuller technical assistance can be referred to the Diamond Research Laboratory, Johannesburg.

Inquiries in connexion with these services should be made to Industrial Diamond Information Bureau, Industrial Distributors (Sales) Ltd, 2 Charterhouse Street, London EC 1.

INDUSTRIAL DIAMOND INFORMATION BUREAU

Industrial Distributors (Sales) Ltd, 2 Charterhouse Street, London, EC 1.

LIST OF PUBLICATIONS, APRIL, 1961

For information on industrial diamonds contact the Industrial Diamond Information Bureau. Backed by the Diamond Research Laboratory in Johannesburg (the largest laboratory in the world devoted to diamond technology), the Bureau offers information and advice without obligation. Please write to the above address.

***INDUSTRIAL DIAMOND ABSTRACTS:** issued monthly, from 1944 onwards, about 20 pp, 7⅞ x 9¾ in. Surveys technical, scientific, and patent literature.

***LIST OF PERIODICALS IN THE INDUSTRIAL DIAMOND INFORMATION BUREAU LIBRARY AT MAY 31, 1958:** Alphabetical, 8 pp, 7⅞ x 9¼ in. A list of periodicals available for loan from the Industrial Diamond Information Bureau Library. This does not replace *List of Periodicals* (above), which is a list of periodicals abstracted in *Industrial Diamond Abstracts*, many of which are not held by the library.

***IDR REPRINT SERVICE :** Classified, authors' index, subject index of groups, 12 pp, 7⅞ x 9¾ in., Sep 1958. (Reprints 1s each, post free).

***THE DIAMOND RESEARCH LABORATORY:** 16 pp, illustr, 11 x 9 in. Rev ed, 1956.

SELECTED BIBLIOGRAPHIES:

* **Truing of grinding wheels** (from 1910 to 1951). 39 pp, 7⅞ x 9¾ in. 3rd rev ed, Feb 1952.

* **Diamond as cutting tool for metals and non-metallic materials.** 24 pp, 7⅞ x 9¾ in. 2nd rev ed, Nov 1950. Name index, 1951.

Hardness and hardness testing (from 1937 to 1955). 118 pp, name index, subject index, 7⅞ x 9¾ in. 1955-56. Price 5s 6d.

DIAMOND TOOL PATENTS (Patent Monographs)

IA: Machining metals and non-metallic substances, by P. Grodzinski, W. Jacobsohn. 2nd rev ed, 55 pp, 7⅞ x 9¾ in. Apr 1949. Price 10s.

II, IIs: Diamond abrasive wheels, by P. Grodzinski. 74 pp, 4 tables, name index, 7⅞ x 9¾ in. Aug 1948/49. Price 13s 6d.

III, IIIs: Truing of grinding wheels, by W. Jacobsohn. 133 pp, 82 illustr, name index, 7⅞ x 9¾ in. Dec 1948/49. Price £1.

IV: Polishing of gem diamonds, by W. Jacobsohn. 40 pp, 83 illustr, 1 table, name index, 7⅞ x 9¾ in. December, 1950. Price 12s 6d.

IA to IIIs available as compilation in Spirollo binding, price £2 9s.

THE PRINCIPLES AND DESIGN OF A NUCLEAR RADIATION COUNTER WHICH USES A DIAMOND AS ITS DETECTOR, by W. F. Cotty. 18 pp, illustr, 7⅞ x 9¾ in. Oct 1956. Price 2s 6d.

---

* *Publication free of charge.*

The Hands of the Craftsman . . .

on the craftsman-built

HABIT

DIAMOND POLISHING MILL

Built to satisfy the exacting demands of the 'HABIT' Diamond Polishing Staff, the HABIT MILL is now available to Industry.

The Habit mill embodies every essential feature for efficient diamond polishing that experienced craftsmen could envisage. Designed to provide an absolutely flat, vibration-free working surface enabling mechanical dops and either simple or complex fixtures to be employed. The internationally famous De Winter Scaife has been fitted, which does not require balancing and which is always parallel to the table to within 002" (0.05 mm).

There are no installation costs—simply plug in to the power supply and start work

★ *Look for the Little Flag!*

Further details on request :

HABIT DIAMOND TOOLING LTD
LURGAN AVENUE . LONDON . W.6
Telephone: FULHAM 7944

a journal for precision engineers and all users of industrial diamonds and other hard materials

INDUSTRIAL DIAMOND REVIEW

incorporating INDUSTRIAL DIAMOND ABSTRACTS

MONTHLY 1/3 SUBSCRIPTION 15/- A YEAR

April, 1961 Vol. 21 No. 245

for perfection in diamond wheels
MANUFACTURED BY IMPREGNATED DIAMOND PRODUCTS LTD · GLOUCESTER
DISTRIBUTED BY UNIVERSAL GRINDING WHEEL COMPANY LIMITED · STAFFORD